REMEMBER EVERYTHING YOU WANT AND MANAGE THE REST

Improve your Memory and Learning, Organize Your Brain, and Effectively Manage Your Knowledge

Helmut D. Sachs

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Remember Everything You Want and Manage the Rest
By Helmut D. Sachs

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To my father and mother

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1 Introduction

We live in information-rich times. Never before have we had access to more and better information. This really can be a blessing – no matter what your interest or information demand, you can go online and find websites, e-books, and videos on the topic of your choice.

If you have valuable skills, experiences, or knowledge to share, you can reach the world with the click of a few buttons.

Do you want to learn how to cook the best Thanksgiving turkey, brush your teeth properly, get rid of termites, see a live surgery, or understand what led to the financial meltdown in 2008 or how our neurons work?

It's all available online.

So, the information explosion really can be a blessing. But is it really? Maybe you don't feel that way? Maybe you feel like you have to do 100 things at the same time and wish you could somehow add another brain or two.

The demands put on you in your professional, student, or daily life are already outstripping your brain's processing capabilities, and the next big information wave is going to sweep you away.

If you feel like this, you are not alone. Never were the demands on our learning and information-processing capacity greater than they are today.

The good news is that you can make the transition from drowning in information to successfully navigating our modern world and steadily building and maintaining knowledge.

This book is going to help you to boost your brainpower and stay on top of information.

It will reveal techniques, tools, and background information in three key areas crucial to your success:

1. **A comprehensive set of memory tools to learn faster and improve your memory in all areas of your life**. The methods you will learn are extremely powerful – you will be amazed what you can do with your brain. We also go into detail on how to best review what you have learned and provide techniques (including suggestions for computer applications) to do this fast.
2. **Effective methods to extract the important information from modern information sources, including the web, books/e-books, videos, and podcasts**. I am going to introduce you to some highly effective computer tools to help you to distill important information and to take notes in innovative ways.
3. **An introduction to powerful computer software allowing you to organize information from all kinds of sources, including the information you have distilled from books and web pages**. Re-finding information, that is, searching for information we have found before, can be an incredible waste of time. I am going to show you how to create a personal digital library to organize your articles, web pages, books, *etc.*

What can you gain from this book?

1. Become confident in your memory, give presentations and speeches without notes, acquire and maintain a new body of knowledge or language fast, become a successful student and pass exams, and remember what you hear, read, or watch. Remember those fleeting new ideas, facts, people's names, numbers, and your passwords.
2. Retain the important information from documentaries you watch, websites you visit, and books and newspapers you read.
3. Understand the power of attention and concentration, and use simple techniques to improve your ability to focus.
4. Use powerful computer tools to support your memory and learning, to extract the important information from web pages, books/e-books, and videos, and to skillfully take notes.

5. Build your personal electronic library to organize information from all kinds of sources.
6. Understand how “mentathletes,” who memorize a deck of cards in less than a minute, a 100-digit number, or the names of all people in an audience, are actually doing it.

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2 How Do We Form Memories?

2.1 The Man Who Couldn’t Remember

On September 1, 1953, a 27-year-old American, now famous under the pseudonym ‘H.M.’, underwent brain surgery to stop the excruciating epileptic seizures he had been suffering from since his early teens.

After the surgery, H.M. found he couldn’t form any new lasting memories. The surgery had indeed stopped his seizures, but it had also impaired his ability to memorize new information.

He could still remember facts and episodes from his life until a certain time before his surgery, but he could no longer remember what he had for breakfast, and people had to introduce themselves again every time he met them. H.M. was frozen in time.

He was tested extensively for his intellectual abilities and scored normal on a standard IQ test, even slightly better than before his surgery. He could also remember a number he had just heard for a considerable time. However, when his attention was distracted from the number, he lost all memory of it. It became apparent that he could only keep the number in memory by constantly rehearsing it.

During a different experiment, he was shown a stimulus (i.e., a shape, color, etc.) and after a varying period of time a second stimulus for comparison. H.M. could only successfully report whether the two stimuli were the same for time periods (between the two presentations) of less than a minute.[1]

In summary, while H.M. could still perceive normally and remember the information he perceived for short periods of time (30 to 40 seconds), he could no longer form long-term memories. The tests performed on H.M and other amnesiac patients suggest the existence of separate short-term and long-term memory processes in our brain.

2.2 The Stages of Memory

To improve our memory and make our learning effective, it is useful to get an idea of how information coming from external sources actually becomes a memory.

How and when does something we see, hear, smell, or feel actually become a long-term memory? Why are we, unlike H.M., not frozen in time? Why can we constantly add to our base of knowledge and experiences?

Three memory processes are involved in memorizing information:

1. Sensory Memory
2. Short-Term Memory
3. Long-Term Memory

Here is an everyday example of how they work together:

You are on a date in a café, and the radio is playing. The voice of the radio host is entering your ear and thus your *sensory memory* (auditory). You are admiring your date and not paying attention to anything else, so the radio is just background noise. The signal for the six o'clock news catches your attention. The host is reporting the lottery numbers. The numbers are 14, 24, 49…

You played the lottery, so now you carefully pay attention. The numbers enter your *short-term memory*. You are getting excited because the numbers seem to be similar to the numbers you have chosen.

Unfortunately, you don't have a pen, so you recite the sequence a few times to memorize it, that is, make it a *long-term memory*. After 10 minutes, you try to recall the numbers again just to make sure: 14, 24, 49… Now the numbers are coming from your long-term memory. After an hour, you are back home and check the numbers. All numbers match the ones on your lottery slip. You must have won at least a million dollars. Chances are, you will never forget your winning numbers again!

2.2.1 Sensory Memory

Whenever a stimulus is sensed (heard, seen, touched, smelled, or tasted), it is, for a very brief time period, stored in the corresponding sensory memory.

There are different sensory memories for our different senses, including an auditory sensory memory, a visual sensory memory, and so on. Sensory memories last for less than a second. If you don't pay attention to a stimulus, the memory is lost.

2.2.2 Short-term Memory

If you do pay attention (as you did for the lottery numbers), the information enters short-term memory. Short-term memory has a duration of less than 30 seconds. However, you can keep your lottery numbers in short-term memory for as long as you want, provided you actively rehearse them (either silently or vocally) and are not distracted.

The capacity of short-term memory is limited to a few items (words, numbers, or image features). For a long time, the assumed limit has been 7 (+/–2) items. Some recent research suggests that the real short-term memory capacity is closer to 4, with individual variations.[2]

That doesn't sound like a lot, does it?

How come experienced chess players can, in a matter of seconds, assess a situation on a chess board with 64 squares and 32 pieces? Why can some people recite a 12-digit number after seeing it only once? Are they smarter than the average person?

Well, not necessarily: we all have a few tricks up our sleeves that allow us to use

our short-term memory more efficiently.

Please get a pen and a sheet of paper to do a little exercise:

Read the following digits out loud. Try to keep them in your memory, and then write them on your sheet of paper without looking back:

3…9…0…7…7…3…6…2…5

How did you do?

Now read the following number. Again, try to keep it in your memory, and write it on your sheet of paper without looking back:

280…661…537

How did you do this time?

If you are like most people, you found it easier to remember the second number.

Why?

Instead of rehearsing nine individual digits, you only rehearsed three three-digit numbers to keep them in short-term memory. Since each digit group is meaningful (i.e., a three-digit number like 280), you only had to rehearse three items instead of nine.

This grouping of information into meaningful units is called *chunking*.

Chunking allows you to keep more items in your short-term memory by combining individual items into meaningful chunks of several items.

2.2.3 Long-term Memory

To remember information for longer periods of time, you have to “transfer it” from short-term to long-term memory. Whenever you successfully memorize something, the information is changed in a way (i.e., encoded) so that it can be “stored” in long-term memory.

An efficient way to encode information is to make it meaningful. We can achieve this by thinking about the information, understanding it, categorizing it, or visualizing it. As a result, we connect (associate) the new information with information we already have in our long-term memory. The more we can connect new information with existing information, the greater the chance we will remember it.

Knowledge builds upon knowledge, and learning can be a virtuous or a vicious circle.

Whether it is learning a language, programming a computer, or studying biology or math, in the beginning it is difficult to retain what we have learned. This is because we don’t yet have any basics in the subject we want to learn, and we don’t yet know how to best learn the particular type of information.

Effective learning always includes connecting (= associating) new information with information you already have in your long-term memory. Your mind organizes information and always tries to integrate it with the knowledge you already have about a subject. Unfortunately, initially you simply don’t have a lot of information about a subject. You don’t know the terminology. You don’t know what belongs where…

This is why many people get frustrated with their memory and give up.

For example, if they attempted to learn a new language, they might say, “The words just won’t stick,” “I am just not good at languages,” or “I have a poor memory.”

But it might just be the wrong time to give up. By learning, retaining, and building on the retained basics, we are creating a rich web of associated information. The more we know, the more information (hooks) we have to connect new information to, the easier we can form long-term memories.

Concepts that may be impossible to comprehend for a beginner become a welcome challenge for an advanced learner. Learning becomes fun. We have entered a virtuous circle of learning, and it seems as if our long-term memory capacity and speed are actually growing.

On the other hand, if we fail to retain what we have learned, for example, by not using effective strategies, it becomes increasingly difficult to learn information that builds on earlier learning. More and more knowledge gaps become apparent. Since we can't really connect new information to gaps, learning becomes an uphill battle that exhausts us and takes the fun out of learning. It seems as if we have reached the capacity limit of our brain and memory. Welcome to a vicious circle.

Certainly, you would much rather be in a virtuous learning circle, so to remember what you have learned, you need to build effective long-term memory structures.

How much capacity does my long-term memory have?

As you are probably already suspecting from our discussion above, used in the right way, our long-term memory has an almost unlimited capacity and can keep information for a very long time.

You could argue that by learning you actually increase your memory capacity: the more you know, the more "hooks" you have, the easier and faster it gets to connect new information.

It should be noted that you do not always need a conscious effort to store information in long-term memory. Things that touch you emotionally, such as very happy or dangerous encounters, and other information that is somehow unusual can form lasting memories without any conscious effort whatsoever.

Some people try to get information into long-term memory by just verbally rehearsing it. This is called *rote memorization* and does work to some extent. It

may even be necessary for some information. Don’t believe anyone who says that repetition doesn’t improve memory. However, you have to be smart about it. If repetition is used without understanding, it is a very inefficient and outright boring way to learn new information.

2.3 Forgetting

Many people complain about not being able to remember important information they have just learned. As we have seen, information only resides in short-term memory for a few seconds. Then it either is forgotten or becomes a long-term memory.

In many cases, this “forgetting” in short-term memory is good because most of the information does not have to be stored in long-term memory. For example, if you are calculating 2*5–2 (without the help of pen and paper), you have to keep the whole equation in your short-term (but not long-term) memory.

First, you calculate 2*5=10. Now you need to keep 10 and –2 in your short-term memory. You subtract 2 from 10 and get 8 as final result.

Let’s suppose you only want to keep this final result; then this is what you need to store in long-term memory. The equation and intermediate results are not important, so after a few seconds they are forgotten. While forgetting the intermediate results is desirable, you want to keep that final 8, so you have to attend to it for long enough to allow for encoding and storage in long-term memory.

Long-term memory is not immune to forgetting either. While some information may seem to be burned into long-term memory, most information is subject to forgetting – at least in the sense that we can’t access it when we need it – even after it has been encoded.

There are several reasons and theories how and why we forget, and forgetting long-term memories in many cases does not mean the information is not there anymore. We may just lack a cue reminding us of a particular piece of information. If someone gives us a small hint (i.e., cues us), we can suddenly pull out the information we thought was lost.

Have you ever gone to another room to do something and then wondered what it was you wanted to do? Let’s say you came from the kitchen and ended up in the

living room, not having a clue what you wanted to do there. You go back to the kitchen, see the red wine bottle, and remember you wanted to get a corkscrew from the living room to open it. The wine bottle reminded you of what you wanted to do. Was the information really “erased” from your memory?

Some people actually don’t really go back to the kitchen. Instead, they mentally retrace their steps and thus remember what they wanted to do.

What can we take away from this example?

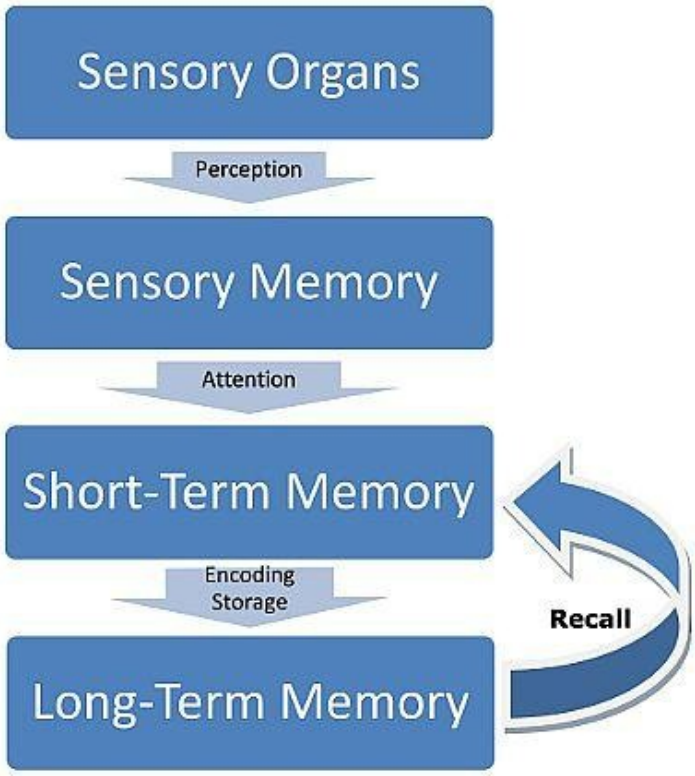
- A good search strategy, for example, mentally retracing our steps, can often help us to recover “forgotten” information.
- If we already think about suitable cues at the time we are memorizing information, we are more likely to recall it later. In the example above, while standing in the kitchen, we can consciously tell ourselves: “I am getting the corkscrew from the living room to open the wine bottle.”

Can’t I just burn in the information and keep it forever?

I’d bet you wouldn’t really want that. Suppose you learned something and later found that what you learned was wrong, or the information has changed, what would you do? Forget it of course. Forgetting is our mind’s way of dealing with unused, unwanted, and outdated information.

For most information to become permanently stored and easily retrievable, you have to recall it from time to time. This act of practicing recall strengthens the memory of a particular piece of information. It is like telling your brain, “This is important; I want to use it.” Likewise, by never trying to retrieve a piece of information, you are signaling your brain that it is not important. In other words, “Use it or lose it.”

Let’s summarize the chapter by looking at the different stages a piece of information goes through before it becomes a stable long-term memory:



Looking at the diagram, we can see why we may not be able to remember/recall a particular piece of information.

The three most important reasons are:

1. Failure to pay attention to the information
2. Failure to properly encode the information (e.g., no or wrong cues)
3. Failure to practice recall

Here then is the answer as to how to improve your memory:

1. Pay attention to what you want to remember.
2. Properly encode the information you want to keep. (This includes thinking about suitable cues.)
3. Practice recall.

It sounds too easy, doesn’t it?

In fact, it is easy, but as the saying goes: “The devil is in the details.” The following chapters are going to drive out the devil of forgetting by giving you effective techniques helping you to focus, encode, and practice recall.

3 The Demands of Modern Life and Your Memory

3.1 Attention, Absentmindedness, and Multitasking

- Where is my key?
- Have I switched off the stove?
- Did I lock the backdoor this morning?

Do these questions sound familiar to you? I have asked myself these questions numerous times in the past, and I have also gone back and checked that the stove was really switched off, and yes, I have also gone back a second time. Many people are “checkers.” For some people checking becomes compulsive.

The main reason why we cannot remember an action is that we never really paid attention to the action while we were doing it. We have not really forgotten whether we switched off the stove or where we placed the remote control. We never committed it to memory in the first place because we didn’t pay attention to the action. As you may recall from the section on “The Stages of Memory,” paying attention is the first step to remembering.

But why is it that we are absentminded while we are doing something so obviously important such as switching off the stove or locking the door?

The main reason is that we have performed the action so many times that it has become an **automatic procedure**. We don’t need to expend mental resources to accomplish it. It is just our brain being efficient.

When I first learned to drive a car, I had to remember every step in the correct order. I learned driving in a manual transmission car, and I really had to focus on what I was doing. During the driving exam, they took the order very seriously. If you forgot to look over your shoulder before you turned on the turn signal (or forgot to look again before you started to drive), you failed. I made sure I remembered the correct order and mentally rehearsed it several times. The procedure required my full attention.

And now?

Starting a car and driving off has become part of my procedural repertoire (a habit). In other words, it has become part of implicit memory, and I can do it on autopilot.

The same applies to other actions we routinely perform; we have become so efficient that we know when to do them and how to do them without paying attention.

Normally, this is fine because it frees up valuable mental resources and allows us to do other things. However, if we want to remember whether we actually did perform a habitual action at a particular time or where we placed an object, we need to make an effort to pay attention to the action while we are doing it.

For example, when you switch off the stove, tell yourself: “I am switching off the stove.” Look at the switch, and report to yourself: “The stove is switched off.” When you come home and put your key on the fridge, say to yourself: “I am putting the key on the fridge.” Look at the key on the fridge.

If you regularly forget where you put an item, make it a habit to always put the item in the same place. For example, put the remote control in a box next to the TV and the keys next to the entrance door. If you always put items in the same place, you can be absentminded while you put them down.

I have a drawer for miscellaneous items. Whenever I want to drop off an item, but not worry about where to put it for the moment, it goes into the drawer. I also have a second drawer for papers, business cards, *etc.* This helps to reduce clutter and to free my mind from keeping track of too many things.

Apart from operating on autopilot, there are two other reasons for attention-related memory (and performance failures):

1. Distraction

This could be external events, such as the phone ringing or one of our children crying, or invading thoughts, like the quarrel with our boss this morning.

Have you ever gone to another room and then wondered what you were trying to do there? You might have had a thought like, “Oh, I need to get the stapler from the living room,” and while you were on your way, you heard your baby making some noise. Then you are in the living room and don’t know what it was you were trying to get. Consequently, you mentally or physically go back to the kitchen and remember that you were trying to staple the shopping receipts together. “Oh yes, I was trying to get the stapler.”

How can you avoid this?

Sometimes you simply can’t. Eminent danger, such as your child trying to run onto the street, requires your immediate attention, so the distraction is necessary and welcome. In many cases, however, (for example, your ringing phone) you do have time to pay attention to what you wanted to do for long enough to allow your mind to properly encode it, before attending to a distraction or another thought.

While you are paying attention, make a conscious effort to commit your action to memory. Again, you can do this by consciously telling yourself in advance: “I am going to the living room to get the stapler.”

As an alternative, you can also take a moment to visualize yourself in the living room, picking up the stapler. By telling yourself why you are doing something or visualizing it, you are automatically *paying attention*. At the same time, you are also *actively encoding* the information – you are creating a mental note. This conscious effort takes a little bit of time and thus slows you down just enough. With a bit of practice, you can make this mental note taking into an almost instantaneous action.

In a later chapter, we will learn the Link System and several different “peg” systems. We can use these systems to make fast mental notes.

2. Divided attention and multitasking

Multitasking, that is, trying to attend to and perform several actions at the same time, is a hallmark of modern times. Multitasking works reasonably well as long as the tasks are not very complex.

Research indicates that short-term memory and attention are closely related. As you may recall, our short-term memory capacity is limited to a few items at a time, and it unfortunately declines slowly as we get older. When we pay attention to a task at hand, we keep information about it in our short-term memory. If we at the same time try to attend to a second task, some information necessary for the first task is likely going to be displaced. In many cases, this leads to a worse performance on both tasks.

You can test this yourself by trying to perform mathematical operations and memorize a list of words at the same time.

When we multitask, we switch our attention between different tasks rather than attend to multiple tasks at the same time. This leads to some information not being attended to, or not enough time being taken to encode the information to long-term memory before it is displaced.

So, while you might have switched off that stove, chances are, you can't remember it because at the same time you were talking to your mother on the phone.

In many countries, using a mobile phone while driving a car is now prohibited. This is for a good reason – experiments have shown that trying to do both at the same time amounts to a reaction time similar to when driving intoxicated. People who talk on the phone while driving have a four times greater risk to be involved in an accident, and the accident tends to be more severe.[3] *This is similar to the accident risk while driving with a blood alcohol level of 0.08%. Contrary to popular belief, the risk does not significantly go down when drivers use a hands-free phone. It is not only the handling of the phone that is causing the reduced performance.*[4]

The vast majority of people simply cannot perform two (or even more) attention-requiring tasks at the same time without severe performance deterioration.

If you are preoccupied with something other than the task at hand because you are following thoughts caused by strong emotions, you are also dividing your attention. Thinking about our new love is a wonderful thing, but most of us

remember quite well that it didn't really help us while we were trying to do our math homework. Similarly, when we are worried, angered, or saddened by something, and thoughts related to these emotions keep creeping in while we are working on a proposal or trying to follow the conversation in a meeting, our memory performance is likely going to suffer.

Summary

The most frequent causes of attention-related memory failures are:

1. Operating on autopilot
2. Distractions
3. Divided attention (e.g., multitasking)

To reduce these kinds of memory failures:

1. *Make a conscious effort to pay attention to what you are doing*. Frequently practice to be in the present moment instead of running on autopilot with your thoughts at some time in the future or past.
2. *Minimize distractions, and when you are distracted by something other than an emergency, take the time to make a mental note of what you need to remember*. *In many cases, you can already make a mental note in advance by telling yourself what you are going to do when you set out to do it.*
3. *Consider using the Number Rhyme System or another peg system (see the chapter on mental filing systems [8]) to make quick mental notes*.
4. *Whenever you do something that is important for you to remember, give it your undivided attention, and do not multitask.*
5. *Put things you tend to lose always in the same place*.
6. *If you have lost something or forgotten what you wanted to do, mentally (or physically) retrace your steps*.
7. *Slow down! By constantly trying to do many things at the same time, we take the fun out of the action and burn ourselves out. We might gain a short-term advantage at the expense of long-term failure.*

3.2 Sustaining Attention and Concentration

When I was a child, my father regularly sent me to pick weeds in our huge garden. To me, as an eight-year old child, there was no end to the task. Initially, I tried to clear some patches, but soon I became frustrated, so I just played around and engaged in dirt-throwing competitions with my older brother. When my father wasn't around, we didn't really accomplish much. I simply could not imagine how anyone could ever finish the job. To my father, the task must have been a small one. He was living in adult time, and half a day wouldn't seem to be a big deal, but to me it was endless.

Have you ever had a similar experience?

The normal reaction to tasks that overwhelm us, either because we cannot see how we can ever finish them, or because the level of difficulty is way beyond us, is frustration. Frustration breeds procrastination and welcomes distractions.

Many of us are faced with a similar problem when it comes to processing all the information with which we are bombarded. Whether you are working or studying, you are likely faced with enormous amounts of information. Deadlines are looming, the phone is ringing, you are following this interesting story on Twitter, you have 50 emails waiting in your inbox, and three papers to read until 3 p.m. this afternoon.

Somehow, you drag yourself to start reading the first paper. You struggle with it for half an hour and can't get your head around it. You don't understand the lingo, so you go on the Internet and look up some words and concepts. Ah, there is a website that seems to be talking about what you need, and it has a couple of interesting links, so you click on the first one. After a while, you have opened 20 different web pages. You are getting tired. Staring at the twenty-first page, you have lost track of what you were looking for in the first place. You feel utterly confused and a bit burned out, but it is time for lunch. After lunch, you are back at your desk, and now you dread going back to this paper.

The fact is, very few people can accomplish much with the strategy just outlined, yet many people use it most of the time.

The time people can concentrate on a task varies with the person and the task. If you find something very enjoyable, you may be productive at it for a long time without feeling the need for a break. When reading a difficult article, however, many people can only sustain their attention for a limited amount of time. After intensive reading of new material for 10 to 20 minutes, we feel “full,” and our mind starts wandering. If we continue beyond our saturation point (i.e., our maximum attention span) with no end in sight, we are going to be a lot less productive.

Most of us never even get to test our maximum attention span. We are prone to distraction. We feel the urge to answer an email, answer the phone, or take out the garbage. After a few minutes, we get back to the task we originally set out to accomplish. At the end, we might have worked on a task for hours, but in time periods of only a few minutes and with multiple interruptions.

To summarize it, many of us are not able to sustain our attention on a given task for the following two reasons:

1. We try to concentrate on a task beyond our attention span.
2. We are being distracted by external sources or invading thoughts. (Sometimes, we even welcome distractions.)

This leads to a decreased productivity, a poor memory, and frustration.

To remedy this, I suggest you try the following:

1. **Use time-boxing**: Whenever you have to work on a difficult mental task, work in fixed time intervals. During a time-box, completely concentrate on the task you set out to do. If your mind starts wandering, don’t get upset; just bring it back to your task.
2. **Push out distractions**: If you get distracted during a time-box, delay whatever demands your attention (unless it is an emergency of course) by

simply writing it on a to-do list or making a mental note, and continue with your task.

3. **Take a break**: After each time-box, take a break of 5 to 10 minutes, and do something completely different. Do not work beyond the end of a time-box. Make sure you get up from your desk.

How long should a time-box be?

This depends on your personal attention span. Your current personal attention span is the time you can concentrate on a task without getting mentally exhausted (and without too much mind wandering). I suggest you initially set your time-box to 20 minutes.

While you are working in a time-box, avoid peeking at a clock. Use a countdown timer with alarm to notify you when the time-box is over. If you find 20 minutes too long, start with a shorter time-box, for example, 10 minutes. If after a few days you get used to concentrating for longer time periods, you can slowly increase the time-box to 15, 20, 25, or 30 minutes. However, keep in mind that the duration should be something you can sustain throughout your day.

Notes:

- *I use the free countdown timer by Comfort Software group.*[5]
- *After you have gained experience with time-boxing, you can also define two (or three) different time-box lengths depending on the task you are working on. For example, when I read, 20 minutes is a good interval for me. For writing, however, 40-minute boxes work better for me. In any case, determine the length of a time-box before you start your work, and then stick to it.*
- *People have used the idea of time-boxing for decades, if not centuries. Time-boxing is a widely used practice in software development. The term was made popular by Scott Shultz in the mid-1980s.*[6]
- *A comprehensive time-management system inspired by time-boxing is the Pomodoro Technique by Francesco Cirillo. Cirillo suggests 25-minute*

intervals and implements a complete estimation and recording system for tasks.[7]

How to deal with distractions?

Internal distractions, that is, invading thoughts or sudden reminders that you need to do something, can usually be delayed until the end of a time-box. To avoid forgetting them and relieve your mind from worrying, make a note on your to-do list or a mental note using a peg system, such as the Number Rhyme System discussed later.

As for external distractions, such as your phone ringing (if you cannot set it to silent) or a colleague, friend, or your mother popping in, also try to delay dealing with the distraction whenever possible. Tell the person on the phone or the person popping in that you are going to contact them at a specific time, and again make a note. In rare cases, you may not be able to delay an action. In these cases, make a brief note to remind yourself how far you got with your task.

Here are some other ideas to block out external distractions: Turn off all email-notifiers, chat-systems (including Facebook), and news-alerts, if you can. Even set your mobile phone to silent. Some advanced phones can automatically send a text to the caller. It is much better to set aside a few times a day for chatting and dealing with email and news than being constantly interrupted. Almost all demands from outside and Facebook friends can wait until the end of a time-box.

How to keep your focus in the face of difficulty, the Internet, and a wandering mind?

First of all, when engaged in a task, such as reading an article, this is your main priority. If you have decided you want/need to complete reading an article, make it a habit to complete your first reading before clicking on any embedded links that might lead to other web pages.

In many cases, you don’t need to go to another web page to understand the basic

ideas of an article. If you must, look up terminology, but keep this to a minimum. If you are reading a chapter in a book, read that chapter, and refrain from opening web pages as much as possible. The same applies to watching a video or listening to a lecture. Do one thing at a time whenever possible. After you have completed your first reading, clarify open questions and bookmark links for further research.

Of course, you don’t have to complete reading an article if you have found that it doesn’t serve your purpose or if you have gotten all the information you need from it. In this case, make a conscious decision to stop reading it, and if the article is on the Internet, close its web page.

If you have completed your article and are still within your time-box, by all means, follow an interesting link. Do you need more time to research and browse information? Make an entry on your to-do list, and reserve a time-box for it. That way, you won’t get lost in Cyberspace.

At times, you really might want to sniff around the Internet and do a bit of random browsing (or just see where your ideas take you). In this case, reserve a specific time-box for your browsing. After the box is over, you have to get up from your desk and take a break.

Mind fog and a wandering mind

Sometimes, we might experience “mind fog,” a wandering mind, or invading thoughts even in the beginning or halfway through a time-box. In this case, I observe my breathing as a kind of background task. While reading, I notice my in-breath and my out-breath at my abdomen. This normally does not distract me and helps me to keep my focus on my reading, especially when my mind starts wandering.

I sometimes engage in shallow breathing when trying too hard to understand something. I suspect the resulting fatigue is due to a decreased oxygen supply to body and brain. Observing my breathing allows me to disengage to some degree and thus stay alert for longer.

What to do during the short breaks?

Make it a habit to get up from your desk, and engage in something completely different from the task you are working on. If you are trying to memorize information, it is important that you let the newly acquired information sink in. To accomplish this, give your brain a break of around 10 minutes.

I personally use two to three 10-minute breaks a day to do aerobic exercise, like dancing to music. This way, I fulfill part of the recommended daily aerobic exercise[8] during my break time. Some top managers even have gym bicycles, steppers, or treadmills in their office.

Making all your breaks 10-minute ones might not be efficient, but aim for at least 5 minutes of disengagement, and get up from your chair whenever possible during your break. Also, if you want to check your email after a time-box, it would be better to take a break first. When you later return to your desk, check your email.

Some options for short breaks:

- Getting up and drinking water or a cup of coffee
- Walking
- Closing your eyes and observing your breathing
- Juggling
- Listening to music
- Drawing
- Creating something with modeling clay

3.3 Stress

Short-term stress of moderate intensity can enhance our memory storage and recall.[9] Too much stress and chronic stress, however, have been shown to significantly impair memory – you can virtually shut down a large part of your memory by stressing yourself out.

Has your mind ever gone blank during an exam or an important presentation?

You knew everything you wanted to say right before the presentation. You rehearsed the presentation 20 times with no problems, yet now you are scrambling to get anything out of your brain. This is what intense stress can do to your memory.

How does our body respond to stress?

Maybe you have heard of the fight-or-flight response. This response is normally triggered by danger, for example, a snake coming out from underneath your bed. Facing the snake, your body starts producing several kinds of neurotransmitters and hormones: Adrenaline and noradrenaline are released almost immediately and put us in an activated, alert state. Our heart starts to beat faster and stronger, our rate of breathing increases, and our blood pressure goes up – all in preparation for fighting or for running away. Within a few minutes, this response is backed up by the release of cortisol into the blood stream.

Usually, after you have killed that snake or run away from it, everything goes back to normal. This short-term stress gets you very focused, and you will likely neither forget the encounter with the snake nor forget what you did in response for quite a while. Cortisol up to a certain level can help to form new memories.

However, many people constantly worry about their future, about the looming deadline, about that person who is out for their job, about the state of their marriage, *etc.* Many of us *are always stressed*, and this chronic stress has a large impact on our body and mind. The body continues to produce considerable amounts of cortisol. Unfortunately, when exceeding a certain level or going on for too long, stress and cortisol impair memory recall and storage. It becomes

increasingly difficult for the brain's neurons to communicate with each other, especially in the hippocampus, an area that plays an important role in learning and memory.[10]

What can you do about stress?

Unfortunately, there is no one-size-fits-all solution since the causes of stress are manifold. For some people it might mean to seek counseling, while for others the only way out might be to change their job. Prolonged stress can seriously affect our health, so please seek timely professional medical help, and do not rely on the following guidelines as a substitute for professional advice.

There are a number of stress-reduction and management programs out there. Stress-reduction techniques include relaxation and meditation techniques, exercising, and going on a holiday. To get you started, I would like to introduce you to Harvard cardiologist Dr. Herbert Benson, who has done pioneering research in stress-reducing techniques.

During the late 1960s, Dr. Benson was able to show that monkeys can be conditioned to raise and lower their blood pressure in response to rewards. At the time when he performed his monkey experiments, a group of meditation practitioners suggested Dr. Benson should study them, rather than monkeys. Indeed, performing their meditation, the practitioners were able to invoke several physiologic changes, including a decreased heart rate, decreased rate of breathing, decreased metabolism, and stabilization of muscle blood flow.

In other words, they were able to invoke a response that countered many of the effects the stress response normally brings about. Dr. Benson subsequently called this response the *relaxation response*. He found that two easy steps tend to invoke the relaxation response, and that they are contained in many different meditation and relaxation practices. Not surprisingly, they can also be found in prayers in almost every religion:

The first step is repetition of a word, sound, phrase, or short prayer. **The second step** is to disregard other thoughts, which may come to mind, and passively

return to the repetition.

You can choose any word, sound, or phrase that conforms to your belief system. Words that are not related to any faith, such as *one*, *peace*, or *love*, work just as well.

During an inspiring lecture at Harvard University in 2004, Dr. Benson instructed the participants in how to invoke the relaxation response.[11]

Here is a summary of his instructions:

1. Choose a word or phrase you are comfortable with.
   Note: *I chose the word "love."*
2. Sit comfortably, and close your eyes.
3. Relax your muscles, starting from your feet.
4. Breathe slowly, and during each out-breath silently say your chosen word or phrase.
5. When you become aware of other thoughts coming to mind, just say, "Oh well," and return to your repetition.

He also suggested the following:

- Do the exercise twice a day for 10 to 20 minutes each.
- Rather than setting an alarm clock, just peek at a clock when you think the time is up. If there is still time remaining, just continue with your practice.
- After you have completed the exercise, keep your eyes closed for another minute, and allow your normal thoughts to return.
- After opening your eyes, remain seated for another minute or so to avoid dizziness.
- Good times are before breakfast and before dinnertime.

This technique is by no means the only way to elicit the relaxation response. Exercise, repeated prayer, yoga, and many other meditation techniques work just as well. Personally, I like this technique because I find it easy to achieve relaxation with it, there are several centers that can help you if you need more instructions, and quite a bit of research has been done on its effectiveness. By all

means, do some research, and choose a technique you feel comfortable with. Also, consult with a medical practitioner if you suspect you might have a medical condition.

3.4 Sleep

Motivation is one of the most important factors when learning a new skill or memorizing information. If we don't sleep enough, we are likely to feel a bit drowsy, dull, and not very motivated.

Lack of sleep takes the fun out of our day and affects our curiousness and drive to learn new things. On the other hand, after a good night's sleep, we feel relaxed, rested, and curious about the new day. Besides, research has found that our brain continues to work while we are asleep. Sleep helps us to improve on newly learned skills, to get new insights, and to consolidate and strengthen our memories.

Here are two very interesting experiments…

In the first experiment, subjects were timed while performing a task involving motor skills. After an initial learning curve, subjects' performance peaked, and further repetitions did not significantly shorten the time needed to complete the task. However, after the subjects had slept over it for a night, their performance increased by about 20% on average![12] Need a 20% performance boost? Go to sleep!

In another experiment, subjects had to repeatedly perform mathematical operations involving numbers. The numbers contained a pattern that would have allowed the subjects to perform the operations a lot faster had they recognized the pattern. However, almost no participants recognized the pattern. The subjects were retested after 12 hours, and about 25% of the participants eventually recognized the pattern. Now comes the astonishing part: after sleeping for one night, 60% of the participants had gained insight and recognized the pattern![13]

So, if you are mulling over a problem, put it aside, sleep over it for a night, and let your sleeping brain work on it. There is a good chance you will have some new insights in the morning.

How long and when should you sleep?

Two competing forces regulate our level of alertness and feeling of sleepiness. The first one is the *homeostatic sleep drive*. The longer we stay awake, the stronger our drive to sleep. The second one is our *biological clock*, also called *circadian system*. During the day, it sends an increasing alerting-signal to our brain to compensate for the increasing drive to sleep. This way, we maintain a relatively stable level of alertness throughout the day.

The alerting-signal is strongest at some point in the evening. Then it decreases and hence no longer compensates for the increasing drive to sleep. This is the time when we normally start to feel very sleepy. Sleeping decreases the accumulated drive to sleep. At the same time, the biological clock's alerting-signal continues to weaken and helps us to sleep for a prolonged time.[14]

The biological clock varies amongst people. On average, it allows for about 15 to 18 hours of waking time and 6 to 9 hours of sleep for adults. Most adults need between 7.5 and 9 hours of sleep.[15] Older people tend to have a lighter sleep, but that does not mean they need less sleep.

If you go to sleep at about the same time every night, you should naturally wake up at about the same time every morning. This is due to your biological clock and triggers like natural light. These triggers (especially light) also help to synchronize your biological clock with the time of the day. It is important to make it a habit to get up at the same time every day to get into a healthy sleeping pattern.[16]

How about naps?

Although a nap cannot substitute for a good night's sleep, it can improve our mood and make us feel less sleepy (naps reduce the homeostatic sleep drive) and more energized. We tend to be happier and motivated, so we learn and memorize much better. Recent research has also shown that naps help to clear our mind and thus allow for an intake of more information and improved learning. To avoid interference with your nighttime sleep, don't take a nap too late during your day, and try to limit your nap to 30 minutes or less. Many people take a nap after about 7 to 8 hours of wakefulness.

4 Memory Building Blocks AVECPO

In the chapter “How Do We Form Memories?” (2), we looked at the process of forming long-term memories. Paying attention to what you want to remember, connecting new information to your existing knowledge by making the information meaningful, and practicing recall are crucial if you want to keep the new information accessible.

This chapter gives you basic but effective building blocks to deliberately create and maintain long-term memories.

The basic building blocks are:

- **A**ssociation
- **V**isualization and mental imagery
- **E**laboration
- **C**ombination of visual and verbal information
- Recall **P**ractice
- **O**rganization

Remembering the acronym “AVECPO” can help you to recall the memory building blocks.

Note: *AVEC means “with” in French.*

Not all information is created equal. Some information can easily be associated with your existing knowledge because you already know a lot about the topic at hand. In this case, strategies like verbal elaboration, visualization, and organization combined with practicing recall will likely do the trick.

Other information, however, may seem arbitrary and difficult to commit to memory. Most of us will then resort to rote memorization (i.e., verbally rehearsing the information until we can remember it). A more effective and

enjoyable way to deal with this “arbitrary information” is to use so-called *mnemonics*.

Mnemonics are extremely powerful and a lot of fun; consequently, I have devoted several chapters to mnemonics. They allow you to associate information with your existing knowledge almost at will. Mnemonics impose meaning and organization where none seems obvious. Inherent in mnemonics are the basic memory building blocks described below.

A word of warning though: contrary to what some memory books promise, you still have to practice recall from time to time to keep the information accessible. In fact, actively practicing recall is probably the easiest and most versatile memory strategy of all.

Let’s take a look at our building blocks AVECPO then…

4.1 Association is the Key to Remembering

I am walking down a street in my hometown. A black Volkswagen Golf drives by. It looks like my brother's car. But – he sold his Golf last month. Now he is driving a red Audi, so it can't be him.

What is going on here?

Well, the black Golf reminds me of my brother (it serves as a cue); this in turn reminds me that he sold his car a week ago and is now driving a red Audi:

Black Golf->brother->sold his Golf->driving a red Audi.

This illustrates how our memory works: We don't remember things in isolation. We remember things in connection with other things. The pieces of information in our mind are linked together.

When you commit something to memory (consciously or unconsciously), you link pieces of information together.

That is, you link new pieces of information to each other and to something you already know. (You make an association between something you already know and something new.)

We can deliberately create an association between two items by connecting them verbally:

Take a red Toyota Camry and a banana.

A red Toyota Camry is driving over a yellow banana.

By making up this sentence, you have just created an association (= a link) between the two items (Toyota Camry and banana) in your mind.

In the future, when you see (think about, imagine, etc.) a red Toyota Camry, you will probably remember the yellow banana. Likewise, a banana might remind you of the red Toyota Camry.

Creating associations, or in other words, linking items, is the basic building block of memorization!

Note: *Making up your own connecting sentence between facts is usually more effective than just reading one.*

Association is the basic building block of memorization:

- To be able to later recall a new piece of information, associate it with something you already know!
- Remembering means becoming aware of an item (seeing or hearing it, thinking about it…) and then recalling other items that are associated with (= linked to) it.
- An item (i.e., a piece of information) that reminds us of other items is also called a *cue*. A cue can be external: for example, you see, hear, or smell one thing, and this thing reminds you of something else. It can also be internal, that is, you think of one thing (i.e., you generate the cue yourself) and are reminded of something else.
- Think about suitable cues at the time when you memorize information, and include these cues in your association.

4.2 Visualization and Mental Images

There are various ways to create associations. In the previous example, the sentence *"A red Toyota Camry is driving over a yellow banana"* verbally connected a red Toyota Camry and a yellow banana. However, for various reasons, the verbal connection might not be strong enough, that is, we might still not remember the banana when we see a red Toyota (our cue).

How can we improve on that?

Probably the most powerful way to associate information is by *visualization*.

Visualization means creating and seeing an image or an animated scene in your mind's eye.

Let's go back to our Toyota and create a visualization. Try to see the following scene in your mind's eye (= visualize it): A red Camry is driving over a yellow banana. You also hear a "Pfft" sound. After the car has passed, you see a flattened banana on the street.

Do you see it?

Note**: For the visualization to work, you don't have to create the scene in picture or movie quality. **Just trying will create the association.

In case you struggled, read the following steps. After each step, close your eyes and visualize it:

1. You are standing in front of your house looking at the street.
2. You notice a yellow banana lying on the street.
3. You hear the sound of a car and see a red Toyota coming your way.
4. The Toyota's right front wheel is rolling over the banana…

How can you create effective associations using visualization?

1. Most important is interaction[17]: The objects you want to associate have to interact in some way. That is, one object has to do something with the other. In the example above, the Toyota is flattening the banana. While still somewhat interactive, it tends to be less effective to visualize a banana lying on the hood of a red Toyota, or worse, a red Toyota standing next to a banana.
2. Check that you include suitable cues in your image to remind you of the information you are trying to remember. For example, after visualizing the scene "a red Toyota is driving over a yellow banana," a red Toyota can cue you for the yellow banana, and a yellow banana can cue you for the red Toyota. However, the scene could take place anywhere. If you also want *your home* to remind you of the scene, include your home in your visualization. Thus, your home can cue you for the scene.
3. Make your image vivid by adding colors, looking at details, *etc.* Look at the Toyota's wheel. What does the rim look like?
4. Make the image unique, so that it stands out in some way.
    - You can do this through exaggeration: maybe the banana is the size of a buffalo – and the Toyota crashes into it.
    - Change the roles: a yellow banana on wheels is driving over a red Toyota.
5. Animate the image: while still images work fine, animation is even better.
6. Use your other senses as well: add sound, smell, taste, touch, emotion…
7. Use reason: Why is the banana there? Maybe your son threw it out. Barry S. Stein demonstrated that interactive images were most effective when they *explained the relationship* between the facts contained in the image.[18]

Why should you visualize and use mental images?

- A multitude of research has shown that we tend to remember images better than verbal information.
- It is fun to create associations by visualization.
- Visualization has been successfully used for more than 2000 years to memorize information. Orators in Greece and Rome memorized speeches

lasting for many hours using visual techniques. We will learn these techniques in later chapters. Mental imagery is a time-tested method to boost your memory.

Does Visualization always work?

Visualization works best for anything you can also see (perceive) in life, in particular still objects, actions, events, and animated scenes and processes. It can, however, also be used to memorize abstract words (such as names), concepts (such as love and peace), and even numbers. To visualize abstract information, you first have to convert it into something that can be visualized. You could, for example, visualize *love* as a *heart with an arrow bored through* it. In later chapters, we will look at some solid practices to convert abstract information into images.

4.3 Elaboration – Add Information

To *elaborate* on something means to add details or other information to it. We usually ask people to elaborate on something to better understand the meaning of what they have said and put it in the proper context.

Let's pause for a moment and think about what it means to understand the *meaning* of something new?

In most situations, it means that we can relate this new information to something we already know, that is, something we have already committed to memory. When we say, "This makes sense," we often mean, "This fits what I already know about the subject."

At the same time, by elaborating on something, we are inevitably connecting the new information to something we already know (namely, the information which helped us to make sense of it) whether we intend to or not. This "connecting" improves our memory for the new information.

Elaboration is extremely versatile because we can elaborate on anything, from isolated facts (e.g., phone numbers) and sentences to complete book paragraphs.

Let's go through two examples and elaborate on facts to make them more memorable:

1. Take the phone number 2354913. How would I elaborate on 2354913? Well, 235 is the number of a bus line I used to take to work, 49 could be the San Francisco 49ers (American Football team), and 13 is Friday the 13th. I added details to the number and thus connected the number to information I already know. This makes the number much more memorable to me.
2. You are introduced to a person named *Bronislaw*, which is a popular Polish first name. Ask yourself what information you can add to the name to make it more memorable. What does the name mean to you? "Bron is law" looks (and sounds a bit) like "brown is law." This reminds me of Thai policemen. In Thailand, policemen's uniforms tend to be brown – "brown is law" –

Bronislaw.

How can you elaborate on new information that is more complex than a single fact?

Reflect on the information by asking yourself questions about it.

Reflection is a powerful method to elaborate on new information: by thinking about the new information and asking questions, we tend to automatically activate existing long-term memories and connect the new information to these existing memories.

This is very different from passively absorbing information presented in a book, lecture, video, TV broadcast, *etc.* It helps to build a knowledge structure, which connects the new pieces of information to each other and to your previous knowledge.

How can you do this?

Let’s say, you are reading a paragraph in a non-fiction book:

1. While reading the paragraph, ask yourself: What does the paragraph heading mean? What are the main ideas in this paragraph? What point is the author trying to make?
2. After you have completed reading the paragraph, restate the main idea(s) in your own words. Tell yourself or a friend what the main idea is, or write it down. Try to do this from memory before you look back at the paragraph.
   Note: It is important to use your own words because this tends to activate previous long-term memories and forces you to check your understanding.
3. Then relate the idea to the examples and illustrations the author has provided and to your own experience and knowledge. To accomplish this, again ask questions:
   - What support does the author provide for his idea?
   - Does this make sense? Why is that so, or why not?

- What additional information about the author's idea do you have from your own experience and previous knowledge?
- Try to come up with examples related to your own life.

Note: *Relating information to oneself, by thinking about personal examples or experiences, tends to create stronger memories. This effect is known as the "self-reference effect."*[19]

After you have completed your reflection, recite the main idea; then recite the connected facts and the additional information you have found by querying your long-term memory.

You have just built a cluster of connected information.

Optional: Give that information-cluster a name that reflects its main idea. If the author has provided a heading for the paragraph, check whether the heading contains a suitable name.

Elaborative interrogation

Let's turn our attention to one specific type of question you can use in your reflection, the why-question:

Research has shown that memory for facts and reasoning using these facts can be significantly improved by reducing the arbitrariness of the relationship between the different pieces of information.[20],[21]

In other words, if you can explain the relationship between facts, you are more likely to recall the facts.

A well-researched strategy to achieve this is called *elaborative interrogation,*[22] which just means asking *why-questions*.

Consider the following example: The U.S. flag has 50 stars and 13 stripes. Now turn that information into why-questions:

1. Why would the American flag have 50 stars? Because the U.S. has 50 states, each represented by a star.
2. Why does it have 13 stripes? The 13 stripes were the 13 colonies that rebelled against the British Government and became the first states of the U.S.

Elaborative interrogation has been shown to improve factual knowledge and promote understanding. You can apply it to whole paragraphs as well as to individual facts.

You need some background information from your long-term memory to generate the answers to why-questions. In many cases, however, you already have enough knowledge to guess an answer. This tends to be enough to boost your memory for facts.

What if you don’t know enough to even speculate about the answer to a why-question?

In that case, try to find an explanation by doing some Internet research.

Sometimes you may not have the time or may just want to memorize the information. For that case, we will learn mnemonics to create associations and impose meaning at will. Of course, you can also use rote memorization (reciting the information several times to memorize it) if you only have a few facts to associate.

In this section, we have mainly looked at verbal elaboration to connect new information to our existing long-term memories. There are other methods to make new information meaningful and connect it to existing long-term memories:

- Visualize the information (4.2, previous section).

- Organize the information (4.6).
- Draw diagrams that express relationships.
- Use verbal and / or visual mnemonics (5).

As we will see later, most mnemonic strategies involve some kind of elaboration, that is, the addition of verbal and / or visual information.

4.4 Combine Visual and Verbal Information

“A picture is worth a thousand words.”

A person who has never seen a sunset can hardly ever comprehend its beauty, and no description, no matter how long, can ever completely convey, what you can take in with your eyes in just a few seconds. Several studies have shown that we tend to learn better by combining images and words.[23]

What does this mean for you?

Don’t rely only on verbal information as a tool for learning and memorization. Otherwise, you strip yourself of the enormous capacity your brain has for perceiving, manipulating, and storing images.

By the same token, even though visualization is extremely powerful, do not ignore your verbal memory capacity and thousands of years of verbal communication and learning either.

When you learn and memorize information, combine visual and verbal information.

With an image, a sequence of images, or an animation, you can visualize processes, the structure of an object, and the relationships between things.

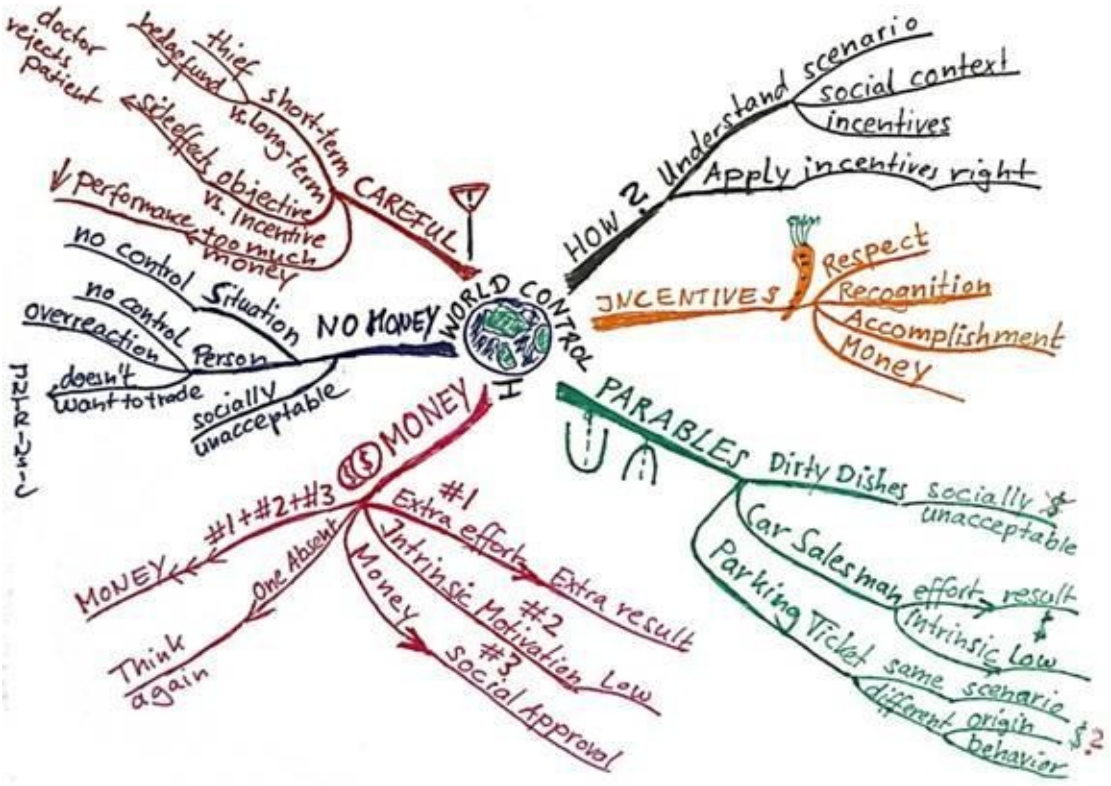
Furthermore, you can organize information in an image (e.g., you can see where everything is located and which is next to what). By later recreating this drawing in your mind (= visualizing it) and then “walking” through it, you can easily recall the components.

While genii like Leonardo da Vinci have always used drawings and images to aid their memory and thought processes, before the advent of computers and the Internet, finding or creating suitable images was a time-consuming process, and hence images were used rather sparingly. These days, finding a suitable visual aid in most cases just means a Google Images or YouTube search, so there is

really nothing to hold us back.

Examples of how to combine images and words:

- A drawing showing a neuron (the main cell type in the brain and nervous system) with text labels close to the different parts
- A map showing the member states of the European Community
- A sequence of pictures or an animation with captions, showing how lightening happens over time
  Note: Surprisingly, a sequence of static images works as well and sometimes better than a full-fledged animation. [24]
- The supply and demand curves from your economics class
- A mind map, summarizing a book chapter:



4.5 Practice Recall to Enhance and Test Your Memory

Whether you want to remember the important information from a lecture, video, book, or article or learn new terminology or vocabulary, practicing recall to test yourself is a very powerful and certainly the most versatile strategy to improve your memory.

Many people know they can improve their memory by reviewing the information a few times, so they resort to rereading the material either once or a few times.

You might consider reading it once, then taking a one-hour break, and reading it again. Alternatively, you could sleep on it for a night and read it again the next day before the meeting or class in which you have to know the information.

However, research has shown that while rereading does improve memory compared to reading only once, the effect only lasts for a relatively short period of time, and the information is soon forgotten.

There is a better way to spend your time: **Test yourself by practicing active recall**.

Practicing active recall means reciting the information you have read, listened to, or watched from your memory rather than reading the information again. You are basically testing yourself.

How do you go about this in a systematic way?

Let’s say, you are reading an article:

While reading, note down questions incorporating the key information you would like to remember. You can use what/who, how, where, when, why… to come up with these questions.

1. After reading the article, take a break of about 10 minutes.
2. Practice recall: try to answer all the questions you have noted down from your memory.
3. Get feedback: After having recalled as much as you can remember, go back to the article and compare your recall with the content. That way, you are getting a feedback about how you are doing. Pay particular attention to the information you have missed.

Spending your time on active recall rather than rereading has two obvious advantages:

1. You are testing yourself and thus are practicing access to the memories you will need in your meeting or exam.
2. You know what you don't know and can focus your time and effort on the information you couldn't recall.

Several experiments have been conducted to compare rereading with recall tests. Subjects were first given time to read a text passage. After this reading period, one group of subjects was given time to reread the information. The members of a second group were given a recall test (lasting for an equal amount of time).

On a first test, given shortly after the study period, the rereading group performed as well or even better than the recall-test group. This is why cramming sometimes works. However, in delayed tests (as short as two days after the study period) the tables were turned: Subjects that spent the extra time on active recall (as opposed to reading again) performed significantly better than the rereading group. The rereading group forgot information at an alarming rate. For subjects in the recall-test group the rate of forgetting was a lot lower.[25]

Here are some additional guidelines:

1. Obviously, you need to spend time to read and understand the material you are trying to commit to memory. But how much time should you spend on reading vs. testing yourself? The time you should spend recalling versus reading and memorizing varies depending on the type of material you have in front of you. As a rule of thumb, spend around 50% of your time

practicing recall.
Note: In an interesting experiment, A.I. Gates had children read biographical facts. He varied the percentage of the total time used for reading versus reciting. The performance on a delayed test 4 hours after studying was best for the group that spent 60% of their time on reciting and 40% on reading.[26]

2. Complete the whole recall test before checking. That is, try to answer all the questions to your best ability (or recite all you can remember) before you check your recall. Experiments have shown that delaying the feedback promotes better long-term retention compared to immediately checking up on your answers.[27]
3. Several recall tests on the information are better than one to slow down forgetting.[28] You ideally want to space out your recall tests depending on how long you need to remember the information. Do a first recall test a few minutes (e.g., 10 minutes) after studying. Then do another one in the evening and another one the next day…
4. If you are reading a textbook or studying for an exam, look for questions (for your recall tests) where you have to actively produce an answer, rather than multiple-choice questions. Practicing with short-answer questions tends to lead to a better performance than practicing with multiple-choice questions (even if your exam contains multiple-choice questions).[29] As an alternative, you can also consider short sentences in which the information you want to recall has been deleted (a cloze deletion test). If you are a student, don't forget to consult your teacher for the type of questions you might be expected to answer.

Practicing recall is not limited to written information:

You can practice recall to enhance your memory for any kind of information and source.

For example, after you have watched something interesting on TV, attended a speech or public lecture, or even hiked on a new trail through the mountains, go through the event again following the procedure outlined above.

Alternatively, tell a friend the interesting parts you have learned. You will amaze yourself by how much more you can retain.

Note: In many cases, TV programming, or at least a summary, is now available as video on demand on the Internet. However, even if no feedback source is available, watching a program and then practicing recall will allow you to retain much more information compared to only watching the program.

4.6 Organize Information You Want to Remember

Take my desk as an example how not to do it. There are at least three heaps of documents, piled up during the last three months, on that desk. I am not always organized, and I always start a new heap after one of the old ones has become unstable and collapsed.

Imagine, a customer calls and asks me about the state of an order he sent a month ago. I am sure the order must be somewhere on the desk, somewhere in one of the heaps… I am getting nervous.

I wish I had filed the documents in some order, maybe a section in a folder for each customer, or at least by time.

Any order would have been better than no order.

The same applies to our long-term memory. Organizing information we want to remember, in a way that makes sense to us, will vastly improve our chance of being able to recall the information when we need it.

There are at least four ways in which organization of information can help your memory:

1. To organize information, you have to think about its meaning and characteristics. This process in itself helps the brain to create more connections and thus more possible ways to retrieve the information.
2. You can create categories of items sharing some characteristics or some kind of sequential or spatial order to organize information. These category names and/or neighboring items will remind you of the information – serve as cues – when you want to recall it.
3. Categories allow you to treat a group of items as one unit, which is very efficient when memorizing these items and/or using them in other thought processes.
4. An order allows you to go about recall in a systematic way; you know

where to start with your recall and when you have recalled all items. As an example, think of a word for each of the letters from a to z. Chances are, you are doing this in alphabetical order, and after you have thought of a *zebra* for *z*, you are confident you have come up with a word for each of the letters of the alphabet. Now, try to do this in an arbitrary order. It becomes very difficult to keep track. You may say, “Oh, that is trivial,” but this is exactly the point. At some point, you learned the alphabetical order that now makes it so easy to go through the letters and be sure you haven’t missed one.

Organizing similar items into categories:

Quite a bit of research has been done on the effects of categorization of information on memory. Particularly enlightening is a series of studies by George Mandler.[30] Mandler asked students to memorize lists with 52 words and lists with 100 words. The students learned the words either uncategorized or categorized in categories they had decided upon themselves.

Among the findings were:

- The number of words the students could remember increased in a linear fashion with the number of categories they used.
- Students could decide how many words to sort into any one category. For category sizes of up to three words, they remembered close to 100 percent. From four up to seven words per category, the recall rate was between 75 and 85 percent. After that, it dropped sharply.
- When students could decide by themselves, they used an average of 4.6 categories.

How do you use categories to boost your memory performance?

- Depending on the number of items you want to memorize, group the information in up to five categories. Each category should contain a maximum of five items.

- If a significant number of your categories becomes too large (i.e., contains more than five items), use a hierarchy of categories and subcategories, again making sure that a category generally does not contain more than five subcategories or items.

You can also organize information using:

- Time
- Location
- From a to z
- From 1 to …
- From small to large or vice versa
- From inside to outside or vice versa
- Logic
- Themes
- Text structure
- A map
- Any other order that is meaningful to you

As mentioned earlier, the order and neighboring items will remind you of the information and allow you to recall it in a systematic way.

Graphical ways to organize information:

- Create an outline, and indent information based on its level in the outline.
- Create a table, chart, drawing, or map.
- Create a mind map: You can organize information graphically in a mind map. This is one of my favorite techniques to organize and memorize material. When I want to memorize the important parts of books or other material I read, I use a maximum of six categories as my mind map's basic ordering ideas. This still goes along with the research findings on categorization, and the mind map fits well on an A4/letter-size sheet of paper in landscape orientation. Because mind mapping is a very effective and enjoyable memory tool, this book contains a complete chapter on mind

mapping.

Let’s apply organization to a real-world example and memorize the member states of the European Union (EU). As of 2012, the EU has 27 member states:

Italy, France, Luxembourg, Belgium, the Netherlands, Germany, the United Kingdom, Ireland, Denmark, Greece, Spain, Portugal, Austria, Sweden, Finland, Cyprus, Malta, Slovenia, Hungary, Slovakia, the Czech Republic, Poland, Lithuania, Latvia, Estonia, Romania, Bulgaria.

I just recited the list from memory. But how come the strange order? How did I do it?

When you want to memorize such a large list of items with confidence, you basically have two fantastic tools:

- Organization
- Mnemonics, which also impose organization (upcoming)

Let’s further assume, you are an American or Asian businessman. You want to learn about European history, geography, politics, and economics. You want to acquire a body of knowledge that allows you to think about the EU and make decisions.

For this, a list of all member states neither on the Internet nor in your memory is enough.

You need a larger and more versatile body of knowledge in your memory, which you can use to answer various questions.

You might want to know:

1. When was the EU formed?
2. Which countries were the founding members?
3. When did a particular country join the EU?
4. Where (on a map) are the former Soviet Republics that joined the EU in 2004?
5. Finally, what are the member states of the EU as of November 2012?

We are essentially looking for the history of the European Union, so a *time line* provides a good starting point for our organization:

Between 1958 and 1973:

- The European Economic Community (EEC) was formed in 1958 by six countries: the founding members were Italy, France, Luxembourg, Belgium, the Netherlands, and Germany.
- In 1967, the EEC was renamed as the European Community (EC).
- In 1973, the United Kingdom, Ireland, and Denmark joined the EC.

From 1981 to 1995:

- In 1981, Greece became a member of the EC.
- In 1986, Spain and Portugal joined.
- In 1993, the EC became the European Union (EU).
- In 1995, three countries joined the EU: Austria, Sweden, and Finland.

The 2000s:

- In 2004, the EU saw its largest expansion to date, with 10 countries joining: Cyprus, Malta, Slovenia, Hungary, Slovakia, the Czech Republic, Poland, Lithuania, Latvia, and Estonia.
- In 2007, Bulgaria and Romania joined the EU.

Of course, a lot more happened in the EU from the formation of the EEC in 1958 to its latest expansion in 2007, but having a good framework, we can always add more information later.

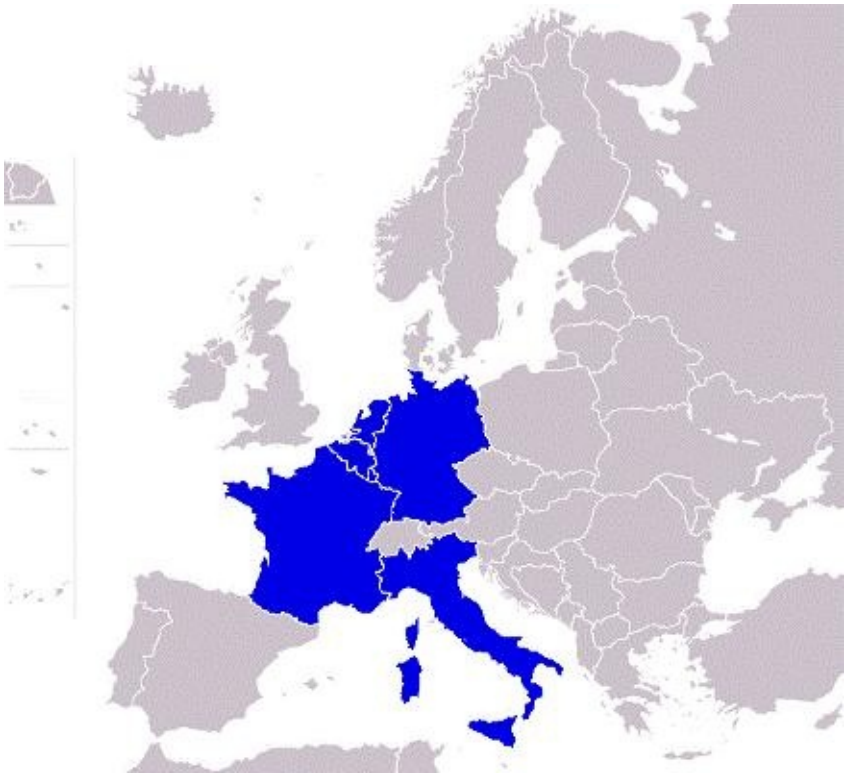
I recited all the above information from memory, and so can you, without a lot of rote memorization. After completing the exercise, chances are, you can also show the exact history of expansion on a map.

How did I do it?

I started by reading an article in Wikipedia and organized eight major milestones by time. I also used a map as a graphical organizer by coloring a European map template showing each expansion stage.

Note: I have used several maps[31] *to demonstrate the procedure. To support your memory, one map and different colors for different stages would suffice.*

1. Which six countries formed the European Economic Community (EEC) in 1958?

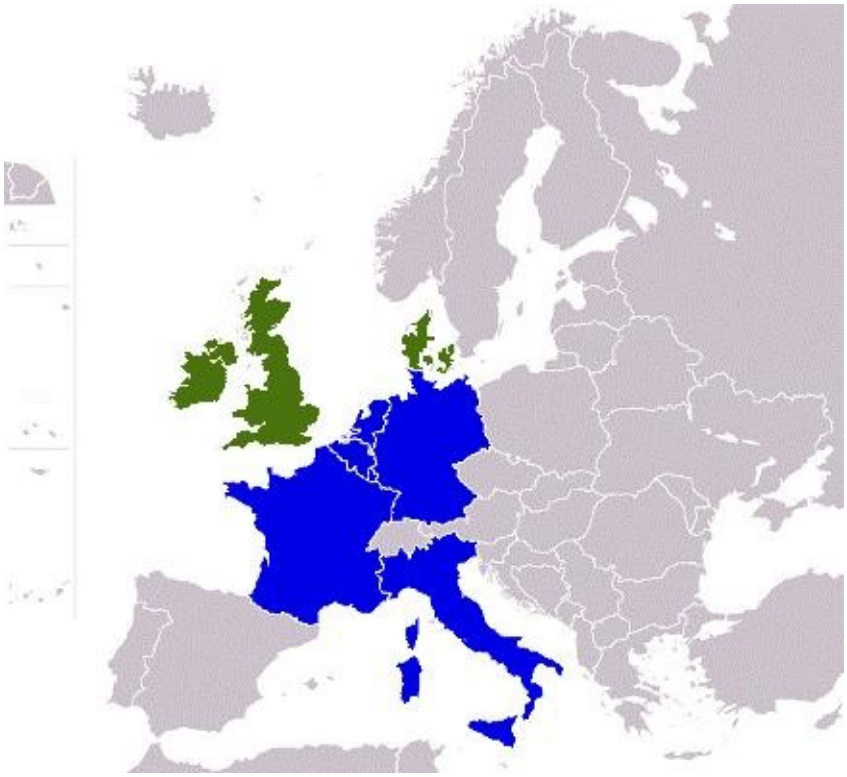


Answer (Going on the map from south to north): The founding members were Italy, France, Luxembourg, Belgium, the Netherlands, and Germany. (Do you see, this is where the recall order comes from.)

2. When was the EEC merged into the European Community (EC)?

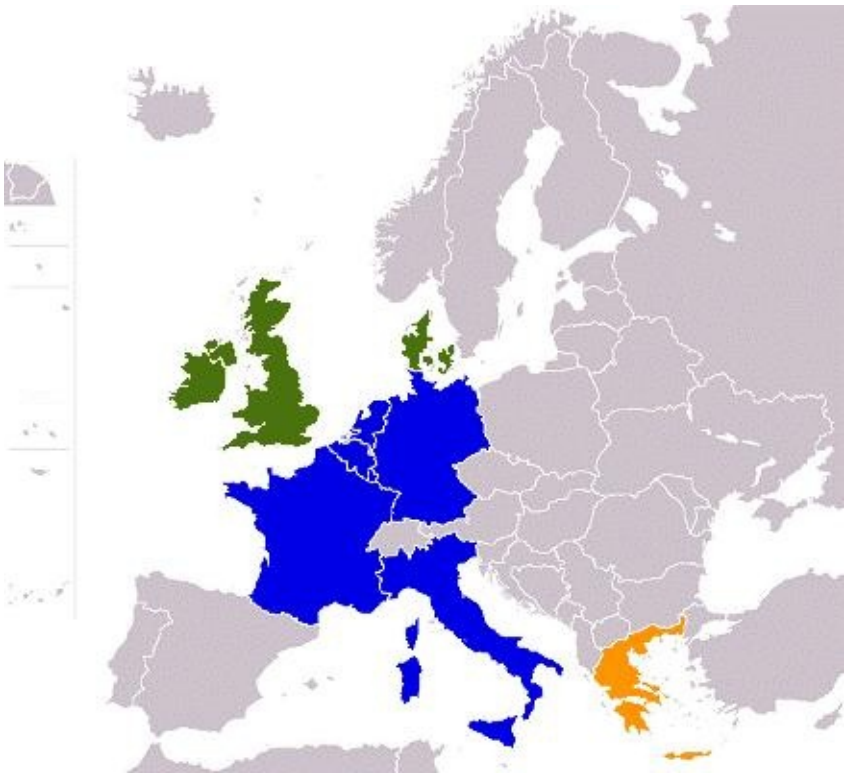
Answer: In 1967.

3. Which countries joined the EC in 1973 (EC 6+3)?



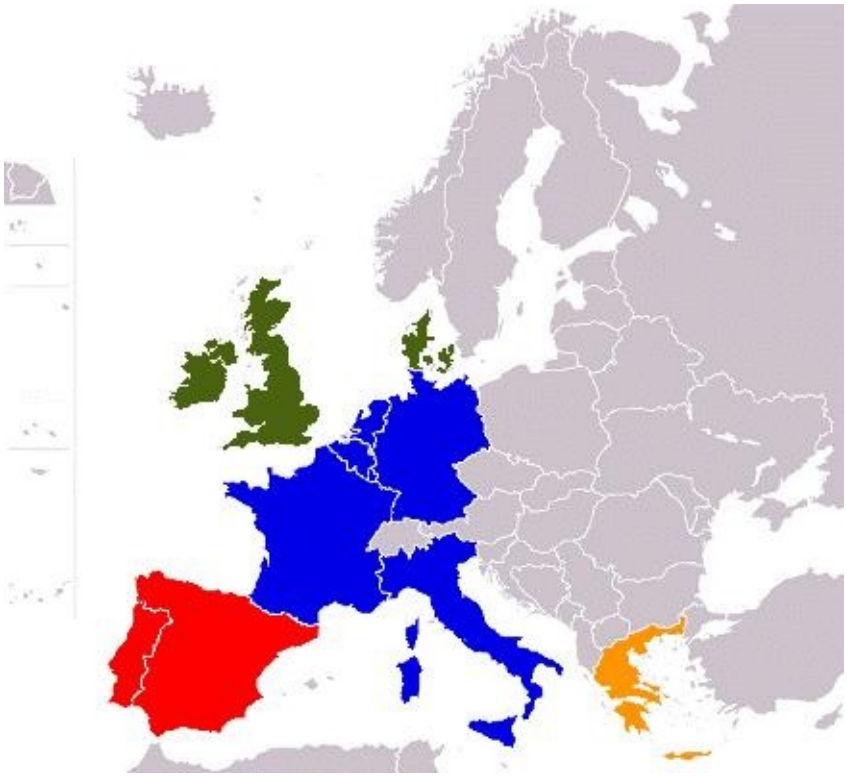
Answer: The United Kingdom, Ireland, and Denmark.

4. Which country joined the EC in 1981 (EC 9+1)?



Answer: Greece.

5. Which countries joined the EC in 1986 (EC 10+2)?

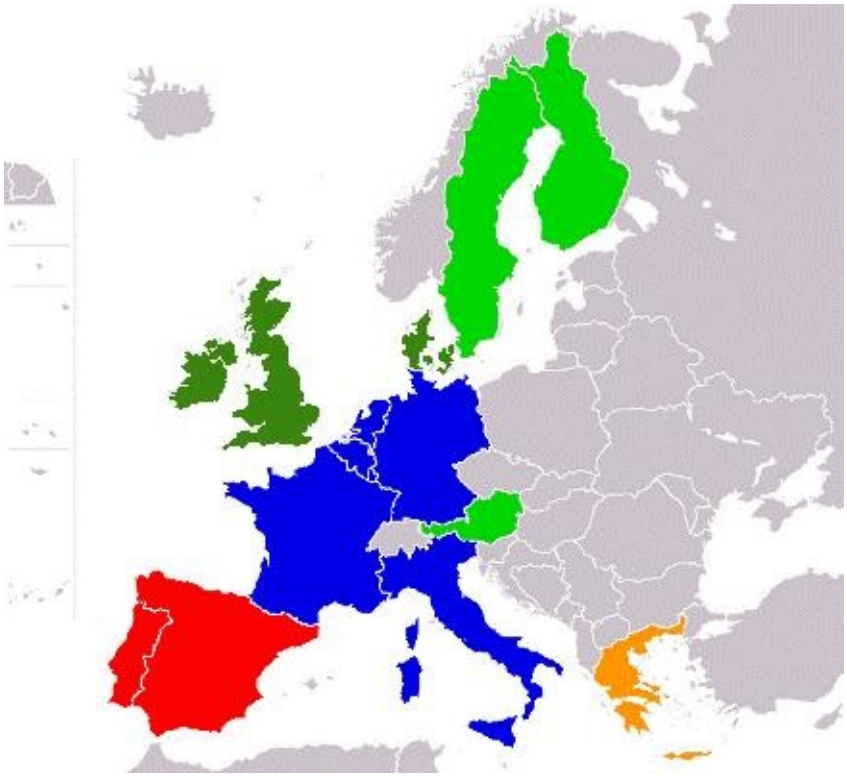


Answer: Spain and Portugal.

6. When was the EU created from the EC (Maastricht Treaty)?

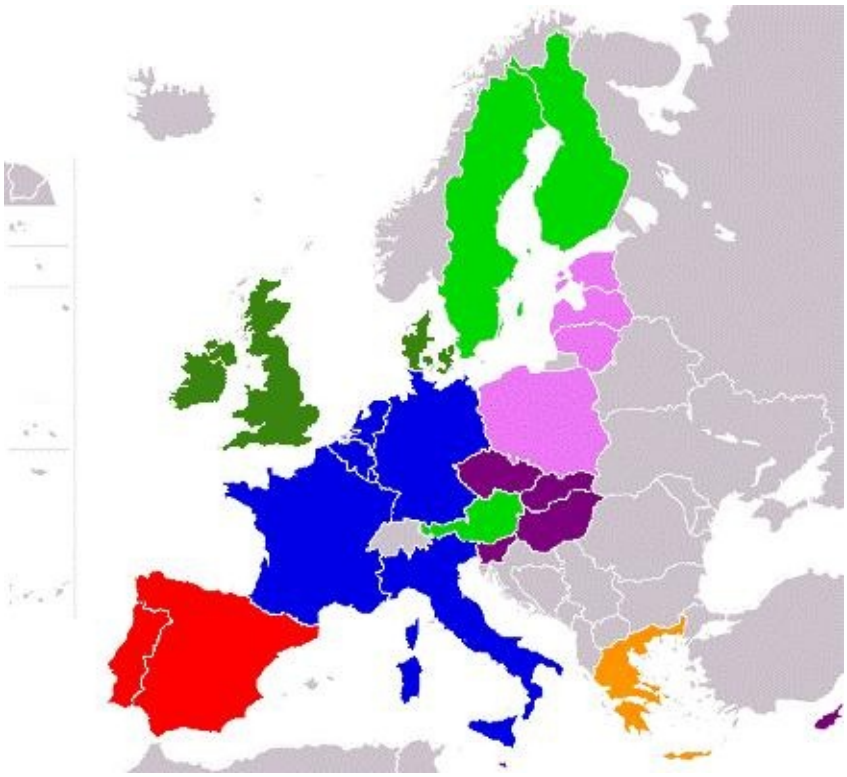
Answer: In 1993.

7. Which countries joined the EU in 1995 (EU 12+3)?



Answer: Austria, Sweden, and Finland.

8. Which countries joined the EU in 2004 (EU 15+10)?



There were three groups:

a. The two Mediterranean islands: Malta and Cyprus.

b. The four countries surrounding Austria to the East:
Slovenia, Hungary, Slovakia, and the Czech Republic.

c. Poland and the northern three Baltic Sea countries, Lithuania, Latvia, and Estonia (PoLiLaEst).

The 2004 expansion is a bit tricky since we have ten countries joining at the same time. If you remember, we should not have categories with more than five items, but here we have ten!

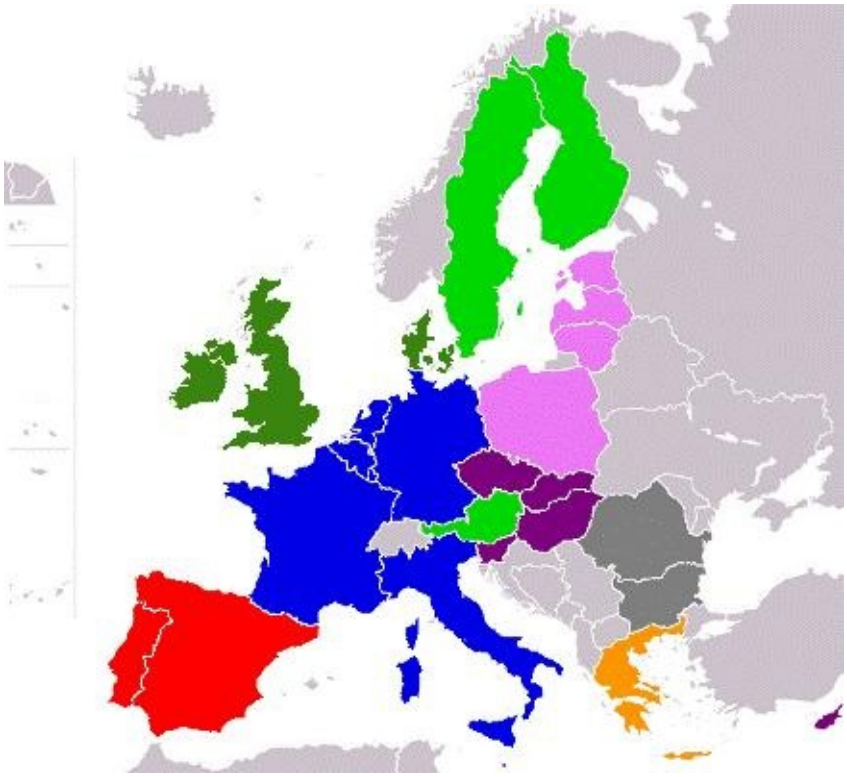
Hence, I have created three groups (subcategories) based on geographical location for the EU expansion in 2004: the two Mediterranean islands, the four countries surrounding Austria to the east, and Poland and the northern three Baltic Sea countries.

Now with a maximum of four items per category, it becomes quite manageable.

Furthermore, since I was not very familiar with the names of the former Soviet Republics north of Poland, I used an acronym to remind me of them: PoLiLaEst.

Important: To establish a fixed order, I list the countries following the map. I like going from south to north. I also memorize how many countries joined at a particular time. This way, when I have to recall the countries, I always recall them in the same order and know when I have recalled all of them.

9. Finally, which countries joined the EU in 2007 (EU 25+2)?



Answer: Bulgaria and Romania.

This completes the history of the expansion of the European Union.

Now we can take a break of 10 minutes and then recall the information in an organized fashion from our memory, using our memory of the timeline, the colored maps, and for 2004, three subcategories.

Please see the section "Practice Recall" (4.5) for further information on how you can make the information stick.

It is a bit of work, but now you have a framework that allows you to answer all the questions we initially posed, and some more. Also, this framework can easily be expanded when the EU becomes larger. Finally, you can easily add more information to your time line.

What's more, you can also guess the answer to deeper questions, such as, "Why are there still restrictions on the movement of labor to central European countries?"

To improve on the organization above and make sure that we won't forget the eight major milestones and associated years, and the events at a particular milestone, we can use mnemonics. I recommend using the Method of Loci (8.3) (a mental filing system) to remember the milestones and the Phonetic Number System (9.1) to make the years memorable. Both systems are described in later chapters.

5 Mnemonics

- KFC stands for **K**entucky **F**ried **C**hicken.
- FAQ is a short-form for **f**requently **a**sked **q**uestions.
- Roy G. Biv helps us to remember **r**ed, **o**range, **g**reen, **b**lue, **i**ndigo, and **v**iolet – the colors of the rainbow.

These short-forms are called *acronyms* and work by taking the first letter (or sometimes more) of a series of words you want to remember and creating an easy-to-remember word – an *acronym*.

To remember that Columbus discovered America in 1492, you can use a rhyme to help your memory: *In 1492, Columbus sailed the ocean blue*.

A popular way to create a memorable phone number is to translate part of it into a word: 1-800 Kansas is easier to remember than 1-800 526727.

Creating acronyms and rhymes and translating numbers into words are all strategies to aid our memory. These and other kinds of strategies to aid memory are commonly referred to as *mnemonics* or *mnemonic strategies*.

The term *mnemonic device* (or short *mnemonic*) refers to a specific aid to help you remember specific information; for example, Roy G. Biv is a mnemonic device.

Mnemonics have been used for more than 2000 years and include verbal mnemonics, visual mnemonics, systems to translate numbers, and complete mnemonic filing systems.

Have you ever seen “memory athletes” memorizing decks of cards, 500-digit numbers, the names of an audience of 100 people, or 40 random items in the correct order? Almost all of them use a combination of mnemonic strategies to accomplish this feat.

Mnemonics exert their power by drawing on one or more of five of the six basic principles we encountered in the chapter “Memory Building Blocks AVECPO” (4), namely:

1. **A**ssociation – Connecting new information and connecting information with something you already know well.
2. **V**isualization – Most Mnemonic strategies connect pieces of information by creating images where the information items interact.
3. **E**laboration – Mnemonics also add additional information to make information more meaningful.
4. **C**ombination of visual and verbal Information.
5. **O**rganization – Mental filing systems, stories, acronyms, and acrostics serve to organize the storage and retrieval of information.

Mnemonics use **AVECO**.

What happened to the *P* – Recall **P**ractice?

This is what most books omit: Yes, mnemonics help you to learn fast and with confidence. They save you a lot of time and allow you to go about your recall in a systematic way. But you still have to practice recall from time to time, and you need use efficient review strategies to build on the time-savings you achieve through mnemonics. We have already started addressing this in the section “Practice Recall” (4.5). In addition, we will look at powerful, easy-to-use strategies and tools in the chapter “Spaced Review, ‘Flashy Cards’, and SPRIT” (6) and throughout the remainder of this book.

Let’s go back to mnemonics: Most mnemonic strategies translate information from one form into another, which is, hopefully, easier to memorize. For example, the Keyword Method translates verbal information into visual information, while the Dominic System translates numbers into images of people and actions.

Here is an overview of some of the most effective mnemonic strategies:

1. **Verbal Mnemonics**
    - Acronyms
    - Acrostics
    - Chunking
    - Rhymes
    - Stories
2. **Visual Mnemonics**
    - The Link System
    - The Face-Name Mnemonic
    - The Keyword Method and the Enhanced Keyword Method
3. **Mnemonic Filing Systems**
    - Peg Systems
    - The Method of Loci
4. **Mnemonic Number Systems**
    - Number Rhymes and Number Shapes
    - The Phonetic Number System
    - The Dominic System

5.1 Acronyms and Acrostics

Let's revisit acronyms. The word "HOMES" is a popular acronym to remember the Great Lakes **H**uron, **O**ntario, **M**ichigan, **E**rie, and **S**uperior.

Acronyms are a fantastic tool to recall a number of words in order.

You create an acronym by reducing a series of words to their initial letter(s) (or other letters contained in them), which then form a word that can easily be remembered.

Acronyms are effective because they not only remind you of the words, but also help you to recall the words in a specific order and know exactly when you have recalled all words in the series.

One of the most difficult memory tasks is memorizing an unordered set of words, bullet points, *etc.*

By forming an acronym, you are essentially changing the memory task from memorizing an unordered set of items to the much easier task of memorizing an ordered list of items.

Because it makes memorizing much easier, you should try to impose an order on what you want to remember even if the order does not matter.

Acronyms are not limited to first letter initials. In the section on organization, I created POLILAEST to remind me that **Po**land and the Baltic Sea countries **Li**thuania, **La**tvia, and **Est**land are member states of the European Union.

Essentially, you can use any part of a word to form an acronym, as long as this part reminds you of the item to be recalled and allows you to form a good acronym.

Limits of Acronyms: Acronyms are effective cues to recall lists of items. You

must, however, already be familiar with the words you want to be reminded of. If you haven't heard the names of the Great Lakes before, HOMES will not help you to recall them.

Acrostics are a very similar strategy: instead of HOMES, we could create the sentence "**H**is **O**ld **M**other **E**ats **S**paghetti" to remind us of the Great Lakes.

That's basically all there is to acrostics. To create an acrostic, make up a phrase, a sentence, or even a poem with words having the same initials as the words you want to remember.

So if the initials of the items you want to remember don't lend themselves to an acronym, try an acrostic.

5.2 Using Acrostics to Create Strong Passwords for Your Email, Facebook, and Bank Website Account

One of the most popular methods identity thieves use to get hold of other people's accounts is just guessing their password. Most of us make passwords that either are very short or contain information that a person only *slightly familiar* with us can guess. Slightly familiar might just mean – they know you from Facebook.

The problem we face is to think up a password we won't forget, but at the same time cannot be guessed by other people.

What is a good password?

Simply put, a good password should be as long as possible and a combination of letters, numbers, and special characters. It also should be easy to remember but difficult, if not impossible, to guess.

- Aim for a password length of at least eight characters; the longer you can make it, the better. For some very important accounts where there is no "three-strikes-and-you-are-out protection," I even use passwords with fifteen or more characters.
- Don't use your best friend's, spouse's, child's, or dog's name or birthday, or any other information that can easily be guessed.
- Also don't use your credit card, bank account, or phone number. You wouldn't want the owner of a website to get a hold of this information.

Whoops, it sounds difficult to create a good password. How do you go about creating one then?

Here is a surprisingly easy solution to this problem using acrostics:

Pick a random book or magazine from your shelf (don't let anyone know which

one you have chosen). Flip through the pages, and find a sentence of at least fifteen words that additionally contains some numbers.

A moment ago, I did just that and found the following sentence:

The **p**hilosophies **a**nd **a**chievements **o**f **t**he **C**hinese **a**nd **G**reeks **2**500 **y**ears **a**go **w**ere **r**emarkably **d**ifferent.

Memorize **your** sentence and share it with no one!

If you don't feel comfortable with one particular sentence, pick another one or create one by yourself.

Next, take the initials of each of the words and numbers, and create your password.

In my case, the result is a password that is fifteen characters long: TpaaotCaG2yawrd

Now, when you want to log in to your account, just mentally replay the sentence you have memorized, typing only the initials and number digits.

Initially, typing the password will take a bit longer, but after a few times it becomes second nature, and you don't even have to think about what to type anymore.

Tip: Replace some characters in your password with special symbols. However, when you do that, create your own substitutions. Do not use common conversions such as '@' instead of 'a', or '2' instead of 'to'.

That's all there is to creating a strong password that is easy to memorize and remember, but difficult for everyone else to guess.

For password-strength-checking websites, please check

rememberevery thing.org/book-resources.

5.3 Associating Information using Visualization – The Link System

In a previous chapter, we already talked about visualization to associate different pieces of information with each other. Here we go one step further and use visualization to memorize a list of items.

As a recap:

To use visualization effectively to memorize information, you need to create an image in your mind's eye (= visualize it) that contains concrete items representing all the pieces of information you want to memorize in this particular image. The items should interact with each other, and the image should be vivid and unique.

To further strengthen the associations and make the image unique, exaggerate items, and add sound, smell, taste, touch, and emotion. Also incorporate logic (for example, by asking why-questions) and consider animating the image.

Let's do a little exercise and memorize a shopping list: suppose you want to buy milk, apples, a water kettle, bread, soap, and a toothbrush.

First, you need a location (a *cue*) that will remind you of your shopping list.

Let that be the fridge in your house.

Do you see the fridge in your mind's eye?

Important: Try to really see everything that follows in your mind's eye!

1. Imagine your fridge at home.
2. You open this massive fridge door and out falls a gallon milk jug.
3. The milk jug pops open, but instead of milk, thousands of small red-yellow

apples come pouring out of the milk jug.
4. The apples are bouncing off the floor like balls and into a huge steel water kettle, at least 1 meter tall.
5. The water kettle morphs into a bread oven filled with nice yellow-brown bread. You smell the fresh bread.
6. You take out one loaf and bite into it. But what is this? It tastes like soap – yuck.
7. Your face is full of blue soap foam, and you are brushing your teeth with an oversized blue-yellow toothbrush in front of your bathroom mirror.

Do you have that?

Now try to recall all the items by starting with the fridge.

Do you remember – you were opening the fridge door? What happened?

Out of the fridge fell a gallon milk jug. The milk jug popped open and out came thousands of apples. The apples all jumped into this water kettle…

If you follow through with this, you can remember all the items on your shopping list in sequence.

The number of items on your list does not really matter that much for applying this technique. You start with a location that you associate with shopping (in this case your fridge). This location becomes your cue for recalling your shopping list. You link this location to the first item on your list. You then proceed by linking the first item to the second item, the second to the third, and so on.

When you want to recall a linked list, you start with your location. This will remind you of the first item, which in turn will remind you of the second item, and so on.

This mnemonic strategy is called the *Link System*. You can apply it to any number of items and, of course, not only shopping lists.

The Story Method

A verbal method similar to the Link System is the *Story Method*, in which you weave the items into a story. Sometimes several items are thus associated with each other in one scene.

This also works fine for smaller lists and has the advantage that if you have forgotten one item, you don't necessarily lose the links to the following items, because several items are likely linked together in one scene.

However, it is not easy to come up with a story when you have to remember a list of 20 or more items. Linking neighboring items (as in the Link System) always works, regardless of whether you have 10, 20, or 30 items.

The Link System is very flexible since you don't have to prepare anything in advance. If you want to remember a list of items (whether in order or not), think of the location (your anchor serving as a cue) you want to associate the list with. Then associate the location with the first item on your list, and continue associating neighboring items until you have all items in a linked list.

This allows you to later retrieve the items in a precise order and is very helpful to memorize things like a to-do list, the days of the week or months of the year in a foreign language, or any other list in order. Besides, you can apply the Link System to improve your memory even when the order is not important.

The main disadvantage is that if you fail to recall one of the associations, you might not be able to recall some of the following items as well.

In addition, it takes a while to access a particular item in a longer list. If you want to know the tenth item in a list of 20, you have to go through all the preceding items to retrieve that particular item. For this reason, the Link System is best used for shorter to medium-sized lists. I recommend that you limit its use to lists with less than 20 items.

As we will see later (8.4), for larger lists, the Link System can be combined very effectively with mnemonic filing systems, such as peg systems and the Method

of Loci. (Don’t worry about these terms for the moment.)

Visualizing and linking abstract information – the countries of Africa

Our shopping list only contained concrete things, which can easily be imagined and visualized.

But how about more abstract information?

How do you memorize lists of more abstract items, such as the names of the months in a foreign language, the states of the U.S., the sixteen federal states (*Bundesländer*) of Germany, or the countries of Africa?

One solution is to translate abstract terms and concepts into concrete items, so that we can again visualize and effectively associate them.

Let’s say you want to remember the countries of Africa. At present, there are 54, but the number keeps going up.

While a list of this size is better memorized using a mnemonic filing system (for example, the Method of Loci [8.3]), the names of African countries can serve as a wonderful exercise for making abstract terms concrete.

The beginning of the list looks like this:

1. Algeria
2. Angola
3. Benin
4. Botswana
5. Burkina Faso
6. …

So how do we make these items more concrete, so that we can visualize them?

Start with Algeria.

The easiest way to make an abstract term concrete is by using the associations that spontaneously come to mind when you look at the name or pronounce it.

What does Algeria remind you of?

If anything concrete comes to mind, take that item. When I pronounce Algeria, the term *algae* springs to mind, and algae are much easier to imagine than Algeria.

Angola reminds me of *angels*, again a very concrete item. Imagine a white angel with wings and halo.

Benin reminds me of *Benny*, a teddy bear I had as a child.

Botswana to me is a *boat* (bot) pulled by a *swan* (swana).

Burkina Faso reminds me of a *bikini*, so I imagine it as a beautiful girl wearing a bikini. Her name could be Burkina Faso.

As a result, we get the following substitutes:

1. Algeria – Algae
2. Angola – Angel
3. Benin – Benny the teddy bear
4. Botswana – Boat pulled by a swan
5. Burkina Faso – Girl wearing a bikini

Do you see where this is going?

I substituted every abstract noun with a concrete substitute term or even several

terms or a phrase as in Botswana. I take the first thing I am reminded of. If it isn't concrete enough, I look at the word again or pronounce the word again to find something easier.

After having come up with my concrete substitute terms, I again apply the Link System, (i.e., create associations between neighboring items) starting with a location:

I imagine a beach in Africa (the beach will later serve as a cue to recall the list of countries) being full of green algae (not a nice picture).

An angel swims in the water and becomes entangled in the algae.

Benny, the teddy bear, comes to the rescue and pulls the algae off the angel and the angel out of the water.

Benny jumps into a boat pulled by a big white swan. Benny says, "Giddy Up!"

The big white swan is snapping at Burkina Faso (the girl with the bikini), who is swimming in the water in front of the swan. It is visibly angry and making a 'sssss' sound.

This way, you can memorize all 54 countries in alphabetical order (or any other order you desire).

"Hey," you might say, "but substituting all the names and then creating the associations takes a lot of time."

Yes, looking for substitutes adds one additional step. However, with practice you can actually do it quite fast.

So how do you go about the whole list systematically?

As mentioned above, the list already exceeds the recommended length of twenty items for the Link System. I recommend translating the abstract terms as described above and then using the Method of Loci, which we are going to learn in section 8.3. It is, however, perfectly do-able to memorize the countries of

Africa with the Link System: Go through the list, and make associations for ten items at a time. Then recall the ten items (peeking at the original list maybe once or, at most, twice), and proceed to making associations for the next ten items… Following this procedure, you should be able to remember all 54 countries in alphabetical order.

How long would it take you to memorize the 54 countries or any other list of 50 items in alphabetical order or in any order by rote memorization?

As far as I am concerned, it would take me hours, and I would probably forget at least ten countries.

Besides, finding concrete substitute items or phrases for abstract terms and then creating vivid associations is fun, while rote memorization is *#$-?!

Note: You can find a complete list of the countries of Africa on Wikipedia. (Check remembereverything.org/book-resources for details.)

5.4 Substituting Concrete Items for Abstract Terms

My first advice is to look at the abstract term and take whatever springs to mind.

Here are three methods you can use if you cannot intuitively find a substitute for which you can create an image:

1. **Use words or phrases that sound similar or have a similar spelling.**
   Algeria – Algae
   Botswana – Boat pulled by a swan
   Alabama – Arab
2. **Use words or phrases that have a similar meaning but can be more easily visualized or imagined.**
   Love – Heart with arrow shot through it
   Justice – Mechanical scale
   Peace – The peace sign
   War – War scene with tanks
3. **Consider a completely different concrete term that will remind you of the abstract term.**

If you know a little bit about an item, you can probably come up with a concrete object or phrase that is typical for this item and will remind you of it.

To this end, ask yourself: “What does this word mean to me? What do I know about it?”

When I see or hear the word *Alabama*, immediately the song “Sweet Home Alabama” (by Lynyrd Skynyrd) pops up. I would imagine a house made of sugar, candies, and cookies and use that “sugar house” as my substitute item for Alabama.

I have a good friend in Orlando, Florida, who used to grow oranges until one winter it got too cold, and the oranges froze. Since that time, oranges have reminded me of Florida, and Florida reminds me of oranges.

Similarly, lions remind me of a safari in Kenya, so I use a male lion as a concrete

substitute item for Kenya.

Finally, to illustrate how important your personal associations are, look at how I substituted Somalia (the name of another African country) with a telephone: There is a German movie called *The Landshut Hijacking* based on the real hijacking of a Lufthansa Flight.

In October 1977, Lufthansa Flight 181 was hijacked by Palestinian terrorists. The terrorists forced the plane to land in Mogadishu, the capital of Somalia. In that movie, then German chancellor Helmut Schmidt used an old-fashioned grey telephone to call his chief negotiator, Mr. Wischnewski, in Mogadishu. To cut a long story short, this old-fashioned grey phone reminds me of Somalia; so that's what I use.

Examples:

Alabama – Sugar house
Florida – Oranges
Kenya – Male lion
Somalia – Old-fashioned grey telephone
Berlin – Bear (heraldic animal of the city of Berlin)
New York – Statue of Liberty

This last substitution method is very powerful and versatile.

If you cannot automatically come up with a concrete term or phrase that is related to the abstract term you want to recall, you can always do some research about the abstract term.

For example:

- What are a town's or a state's landmarks?
- What concrete information can you find in the American Declaration of Independence that will clearly remind you of it?

The only drawback to this method of substitution is that you must already know how to pronounce and spell a term you want to recall. If you want to memorize

the spelling or pronunciation for a completely new word, this method alone will not help. In that case, it is better to look for sound-alike words and phrases.

However, if you want to use the Link System or any other memory system to recall Florida as one of the United States, an orange will do just fine.

5.5 The Keyword Method

The *Keyword Method* (also called Keyword Mnemonic) is among the most widely researched mnemonic techniques. The basic idea is to connect a word with its meaning using imagery.[32]

The Keyword Method is, in fact, a special case of the Link System. It has been very successfully used to learn foreign language vocabulary and subject-specific terminology.

The Keyword Method is best explained by going through an example:

Let's say, you are learning German and want to remember that the German word *Fallschirm* means parachute in English.

1. The first step is to find one or more English sound-alike words (contained in the foreign language word) for which you can create an image. Fallschirm sounds a bit like fall chimp (chimpanzee) – a falling chimp. You could visualize a chimp falling off a cliff.
2. Next, connect that image with the English meaning – a parachute. Visualize the falling chimp opening its parachute and gliding safely to the ground.

This interactive visual association is usually enough to memorize the English meaning of a foreign word.

How does retrieval work?

When you see or hear the word *Fallschirm*, you likely remember the sound-alike fall chimp. This in turn triggers the image of the falling chimp opening its parachute. Ah – "Fallschirm means parachute."

Here are the steps for creating a keyword mnemonic:

1. Look at the new word you want to remember. What does it sound like (in

your mother language)? What words are contained in the word?
2. Take one or more of the sound-alike words, and visualize them.
3. Next, look at the meaning/definition of the word: form an image for the meaning.
4. Mentally combine the images into one interactive image.

To retrieve the meaning/definition:

1. Look at the word: What did it sound like or remind you of? What was it associated with?
2. The image will come back to mind, and you can retrieve the meaning of the word.

The Keyword Method is also very effective for learning subject-specific terminology.

For example, to remember the names and functions of the different parts of the brain, M. Britt has suggested a complete set of mnemonics[33]. Let's look at his mnemonic for the hippocampus:

The hippocampus contains the word hippo. Visualize a large hippo running around on a university campus. One major function of the hippocampus is memory. So imagine the hippo running around with a compass around its neck, because it lost its memory of how to get back to the swamp.

5.6 Remembering People's and Fish Names

It has happened to me many times: I recognize a person and maybe even remember some details about him or her – he is a teacher at the local college; she is from France and doing some consulting work for my friend's company…

The problem is – I just cannot come up with the name.

When this happens to me, I normally just ask for the person's name again – and this time I really pay attention and memorize it.

I have found that most people (including myself) don't mind being asked again, and I encourage you to do the same. This frees the mind from always wondering what the other person's name was and constantly using pronouns and other clumsy workarounds. I just enjoy the conversation much more with the name problem out of the way. Besides, if you leave a person a second time without knowing their name, how will you feel the next time you see them? Maybe you will try to avoid them altogether to avoid another awkward conversation. By all means, if you have forgotten a person's name, ask again.

Remembering a name (like any piece of information) starts with paying attention. Quite often, people cannot remember a name because they haven't paid attention to it in the first place. The name never really entered their memory. Therefore, your first step is to make sure that it does. When you meet someone new, and they introduce themselves, listen carefully to the name. Pay attention to what the other person is saying. Slow down the introduction by repeating the name:

A: "Hi, my name is Frank."

You: "Nice to meet you, Frank. I am Steve." (looking at Frank)

If it is a difficult or foreign name, and you are not sure if you got it, ask the person to repeat the name:

A: "Hi, I am Socheata."

You: "Nice to meet you. Sorry, I want to make sure that I got your name right. Could you repeat it for me please?"

You can easily repeat the name one more time during the conversation and during your goodbyes without making people feel uncomfortable. Also, make sure that you look at the person's face while repeating the name. This automatically strengthens the association between a person and their name.

Paying attention and repeating the name is often, but not always, enough to remember it.

A very effective method to boost your name memory and remember another person's name is the *Face-Name Mnemonic*. What you want to do is to associate the person's name with a distinctive feature of that person by creating an interactive mental image containing the person and a visual representation of their name.

Here is an example:

1. A man introduces himself to you as Ray.
2. The name Ray immediately triggers the association with stingray.
3. You look at Ray, and his big, slightly reddish nose catches your attention. (This becomes the distinctive feature.)
4. You visualize Ray being stung by a stingray right into his nose (your interactive image).

The next time you meet Ray and look at him, you will likely again notice his nose. This will trigger the image – stung by a sting ray – and in turn trigger his name – Ray.

Let's formalize the steps:

1. Pay attention to the person's name.
2. Associate the person's name with something meaningful, so that you can visualize it.
3. Look at the person, and find a distinctive feature. Look at his face first (hairline, eyebrows, eyes, nose, and chin). You don't necessarily have to use

a feature from the person's face though. If the first thing that strikes out is his potbelly, nothing keeps you from using that (just don't tell him). If you can avoid it, don't use something that can easily be changed, such as glasses. Maybe the next time the person is wearing contact lenses.

4. Create a mental image in which the person's distinctive feature(s) and the visual representation of his name interact with each other.

Recall:

When you see the person the next time, you will likely notice the same feature; this in turn triggers the image from which you can get the name back.

Note: Just trying to apply the steps 1 to 4 tends to increase the memory for a name. Even if you cannot immediately associate the name with something meaningful or create an image involving the person and the name, you are still much more likely to recall the name when you see the person the next time.

For step 2, associating the person's name with something meaningful, you have several options:

1. Some names are already meaningful and can easily be visualized. In English, this includes many last names, such as Smith (blacksmith), Hoover (vacuum cleaner), Brown (color), Miller, Walker, *etc.*
2. In many cases, you might already know a person bearing the same name. This might be a friend or a famous figure. If a woman with curly red hair has just introduced herself as Jenny – and you have a good friend named Jenny – create an image where your friend Jenny pulls your new acquaintance's hair. The person's name is Julius – picture Julius Caesar.
3. For other names that don't immediately trigger an association, create a sound-alike name or phrase that can then be visualized (see also "The Keyword Method" and "Substitutes Concrete Items for Abstract Terms").
   Here are my substitutes for three rather unusual surnames, which I picked randomly from the New York City phone book:
   Kurzawa – Coors ABBA
   Kazimiers – Cashmere

Rhee – Reh (German for deer)

Initially, it might take a bit longer to come up with substitutes, but once you get some practice, you will be surprised how fast you can find substitutes. As an alternative, ask yourself, “What does the name rhyme with?”

This brings us to the question of whether you should memorize the first name, the last name, or both. This depends on the country and the setting in which you meet a person.

In the U.S., the first name is enough for most situations. In formal settings, German people will normally introduce themselves with only their last name. Younger German people in informal settings might only use the first name.

In China, people might give you their full name (last name first) or their last name, and in business settings you want to use their last name and their title. For example, if you encounter a manager with the surname Zhang in a business meeting, you want to say Manager Zhang instead of Mister Zhang.

I suggest that if you come from a different cultural background, read up on the etiquette for the particular country, and if in doubt, ask the person (or a person who knows them) how they like to be called.

My substitutes for the ten most common English surnames:

1. Smith – Blacksmith with hammer
2. Johnson – Johnson's baby powder
3. Williams – A German name for a liquor made of pears
4. Jones – Grace Jones
5. Brown – Braun electric shaver
6. Davis – AVIS – Rent-A-Car
7. Miller – Miller
8. Wilson – Tennis racket (Wilson)
9. Moore – Moor (swamp)
10. Taylor – Taylor

Should you write down the names of people you meet?

If you are running a business or are in any other position where meeting people and building relationships with them is important to succeed, it is a good idea to write down the names of people you meet and the date and place where you met them.

A good time to do this is after you have returned from a meeting or after a customer has left your shop. Mentally go through the meeting again, and conjure up your mental image of each person you met and their name. The process of actively recalling the names and writing them down will further strengthen your memory.

Tip: Evernote is a nice app for smartphones, tablets, and PCs to jot down, collect, and synchronize all kinds of information bits, including names and name cards.

How about the Face-Name Mnemonic and fish?

The use of the Face-Name Mnemonic is not limited to people. In 2003, Carney and Levin had students use the Face-Name Mnemonic to memorize the names of 20 different fish species using a picture and a keyword for each of the fish species. Students who used the mnemonic could identify significantly more fish than a second group who used their own method.[34]

In a similar experiment, Carney and Levin used the Face-Name Mnemonic in experiments in which students had to associate paintings with the artists who painted them. Again, the students who used the mnemonic outperformed a control group. By having students focus on the paintings' style instead of individual features, the students could even reliably identify the painter for new works they had not been trained on.[35]

How can you make use of this?

Whenever you are given a group of pictures or drawings and are required to memorize the names that go with the pictures, the Face-Name Mnemonic can be

used as an effective strategy by applying it for each drawing-name pair:

Convert the name into something you can visualize, look for an outstanding feature in the picture/drawing, and associate the visualized keyword with that feature. So if you want to become an expert on game fish, why not grab a picture fish book, apply the Face-Name Mnemonic, and then test yourself by covering the fish names.

6 Spaced Review, “Flashy Cards,” and SPRIT

Most of us are quite used to the “fact” that information doesn’t stick the first time we hear or see it. As you might recall from the chapter “Memory Building Blocks AVEC**P**O” (4), practicing recall is a very effective strategy to improve your memory.

If you had to remember large amounts of information in the past and tried to systematically review this information, you probably know that it is not easy to keep track of *when to review what*.

If you learned a foreign language, chances are, you had to go over the words several times before you could recall them with ease. You probably experimented with different ways to review vocabulary.

One way would be to write a list of the words you want to memorize on a sheet of paper, with the English word on the left side and the foreign word on the right side, or vice versa.

You then go over the list a couple of times to memorize the words. After a few reviews, you can probably remember most of the words. Some of them will be more stubborn, but eventually, you can hang on to them as well. “You have got them in your memory.”

To practice recalling the words, you typically cover the foreign side of the table, or the English side, and test your knowledge. Let’s say you remember 70% of the words. The other 30% you recite again until you can recall them.

You put them away, and the next day, or a few days later, you do the same thing again… until you are satisfied with your result.

The use of this method is not limited to vocabulary.

When we want to learn any kinds of facts, terminology, formulas, procedures, structures, etc., we tend to write the information down, go over it a couple of

times to make sure we know our stuff, and then practice recall to test ourselves. Some of the information we can recall with ease, but some of the material is more stubborn.

There are some problems with this straightforward review method, which make it impractical as a long-term strategy:

1. You remember the material until the next quiz, exam, meeting, or the end of your seminar, if you are lucky, and then it gradually vanishes. This is not good enough for information you need as a basis for other things you want to learn. Since things build on each other in almost every field of study or profession, the appearing knowledge gaps can become a real problem.
2. The more you learn, the more difficult it becomes to keep track of what you know and what you don't know.
3. During review, you have to go through most of the information, some of which you already know by heart. This becomes increasingly annoying and boring. You are wasting time, instead of focusing on the material you don't know.
4. Some parts of your notes tend to cue other information, and if those cues are not present when you try to recall a particular piece of information, you may not be able to access what you are trying to recall. Sometimes cueing by neighboring information is desirable; however, when you order a cup of coffee in a café in Madrid, you cannot reasonably hope that the word preceding or following the word *cup* on your Spanish vocabulary list is written on the café's wall.

Keeping these problems in mind, let's look at a long-time review strategy and suitable formats:

To keep information, you have to review it several times by practicing recall or using it. An efficient review strategy involves gradually increasing the time interval between repeated reviews. I call this strategy **SPRIT** (Spaced Review Increasing Time Intervals).

I recommend reviewing newly learned material 10 minutes after initial learning

(take a 10-minute break and do something completely different) and again a couple of hours later. Then double the time interval between subsequent reviews; that is, review after 1 day, 2 days, 4 days, 1 week, 2 weeks, 1 month, 2 months… The inter-review intervals are not cast in stone, but rather depend on the difficulty of the material and you.

To implement SPRIT in an efficient way we want to:

- Spend the majority of our time focusing on the important information we don't already know well.
- Review by practicing recall rather than rereading.

To accomplish this, you need to have the important information in a concise, easily accessible format and a way to keep track of which parts of this information you already know.

The following formats make reviewing and practicing recall easy and efficient:

- Mind maps (see the chapter on mind mapping [10])
- Collapsible outlines (see the section "Note taking and Outlining with OneNote" [16.1])
- Mental filing systems containing the key points (see the chapter on mental filing systems [8])
- Flash cards (this chapter)

For fact and language learning, I suggest you use either index cards and a card box or a computer flash card program. On one side of your index card (= flash card), write a question, or make a small drawing, table, chart, *etc*. with missing information indicated by an arrow or a question mark. On the other side, note down the answer.

6.1 The Leitner Box System

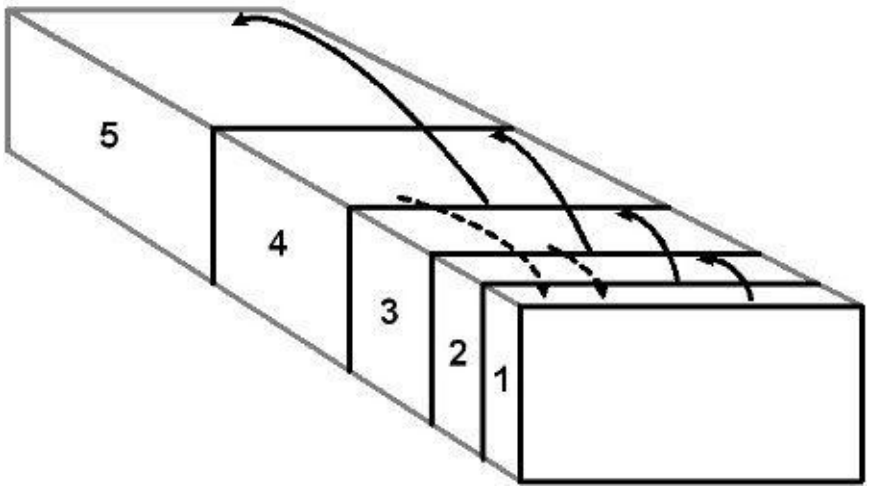
If you prefer to work with paper index cards rather than computer flash cards, the *Leitner Box System* is an easy to follow and effective system.

This system uses paper index cards and a card box with compartments of increasing size. Remembered cards move through the different compartments until they have been reviewed a sufficient number of times.

This system makes it easy to efficiently learn and review a large number of facts, vocabulary, *etc.* Austrian journalist Sebastian Leitner proposed it in 1973 in his book *So Lernt man Lernen (How to learn to learn)*.[36]

How to use the Leitner Box System?

Get (or make) a card box you can partition into different compartments of increasing size (1cm, 2cm, 4cm, 8cm, 16cm):



The steps to learn and review with the Leitner Box System:

1. Take an index card; write your question on the front side and the answer on the backside.
2. Complete up to 10 index cards in this way and learn them. Place the learned cards in compartment 1.

3. On the next day, start reviewing: beginning with the foremost card, go through the cards in compartment 1 one-by-one and answer the questions.
   Note: cards in compartment 1 are reviewed every day.
4. Compare your answer with the backside. If you got it right, the card is placed in compartment 2 (as the last card). If not, it goes back to the last position of compartment 1.
5. Once compartment 2 is almost full, take a finger-thick stack of cards from compartment 2 and answer them. Cards you answered correctly move to compartment 3 (again in the last position). Demote every wrongly answered card to the last position in compartment 1.
6. Once compartment 3 is almost full, take a finger-thick stack of cards from compartment 3 and review them. Again, cards you answered correctly move to compartment 4 while wrongly answered ones move back to compartment 1.
7. For compartments 4 and 5, proceed in the same way.
8. Correctly answered cards from compartment 5 can be archived in a separate card box.

Why should you use this system?

- After a card has moved through all five compartments, you will remember it for a long period of time.
- The order of the cards changes over time. Some cards move to the next compartment, while others go back to compartment 1. That way, you can be confident that you can remember a fact, new word, *etc.* in different contexts, and not just in one order.
- Except for compartment 1, which is reviewed every day, the interval between reviews is not completely fixed, but varies based on how many cards you learn every day. You don’t have to keep track of the time interval yourself, provided you keep learning new cards.

Optional: If you don’t learn new information for a prolonged period of time (for example, when you are on a holiday), cards in higher numbered compartments might not get reviewed for a long time. To remedy this, you can review the cards according to a time schedule:

Compartment 1 – Every day

Compartment 2 – Every 2 days
Compartment 3 – Every week
Compartment 4 – Every 2 weeks
Compartment 5 – Every month

For easier material, you can extend the intervals. You can also review the cards earlier if you are, for example, studying for an exam.

6.2 SPRIT with a Computer Flash Card Program

By using a computer, you can completely relieve yourself of any worries about when to review a given piece of information. Modern computer programs adapt to the difficulty of the material and automatically schedule the review before a piece of information is forgotten. Difficult flash cards are automatically reviewed more often, so that you spend your time on the cards (information) you don't know.

Two main types of programs are available:

1. Programs based on the Leitner Box System, with a fixed review schedule. That is, all cards follow the same review schedule.
2. Adaptive programs, which automatically change the review interval for individual cards based on the difficulty of a card.

Note: A list of recommended programs can be found at the end of this chapter.

Both types are easy to use and can help you to memorize a large number of facts, vocabulary, *etc.*

We have already talked about the Leitner Box System, so let's take a look at adaptive programs.

Most adaptive programs are based on (or at least inspired by) the research of biologist and computer scientist, Dr. Piotr Wozniak.[37] While studying for his Master degree in Biology, he became increasingly frustrated with the large amount of information he had to memorize.

He realized that information he could recall on exam day was soon forgotten. His quest to really learn, rather than just memorize for quizzes and exams, led him to the creation of a program called Supermemo. As far as I am aware, Supermemo was the first program that could schedule the review of *individual* flash cards based on their difficulty. It is still updated and widely used.

This is how adaptive flash card programs work:

As before, you create flash cards with pieces of information, such as facts, vocabulary, *etc.* Every card has a question side and an answer side. Cards for different subjects can be placed in different categories. Depending on the program, you can also use images and sound on flash cards. I highly recommend using images wherever possible.

For every new card you input and every card you review, the program asks you to rate the card from 0 to 5 depending on how good you feel your recall is.[38]

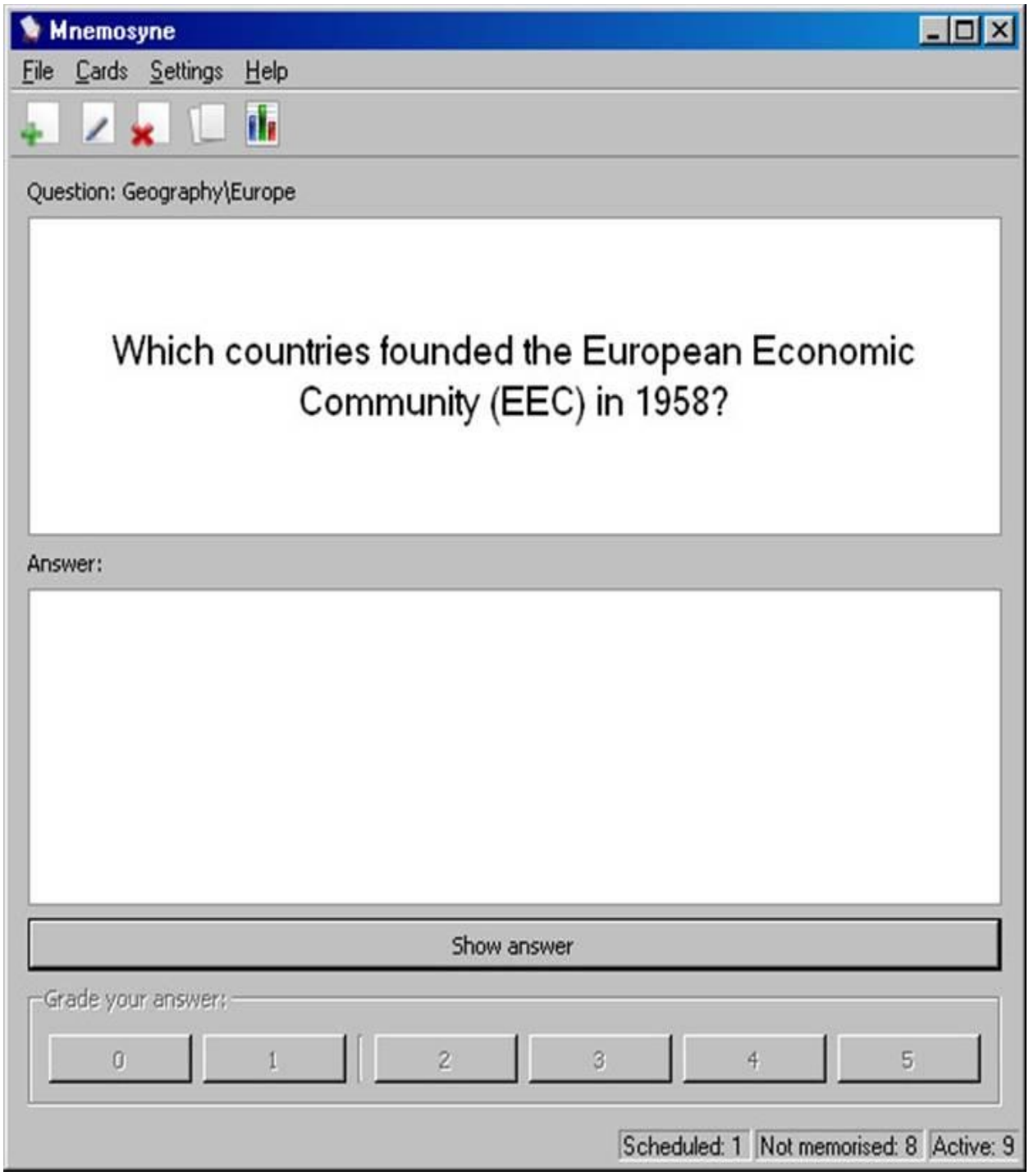
Grade 0: I cannot recall the information.

Grade 1: I cannot recall the information, but it is becoming more familiar.
Grade 2: I can barely recall it.
Grade 3: I can recall the information with some effort.
Grade 4: I can recall the information. (The interval was just right.)
Grade 5: I can recall the information. (The interval was maybe too short.)

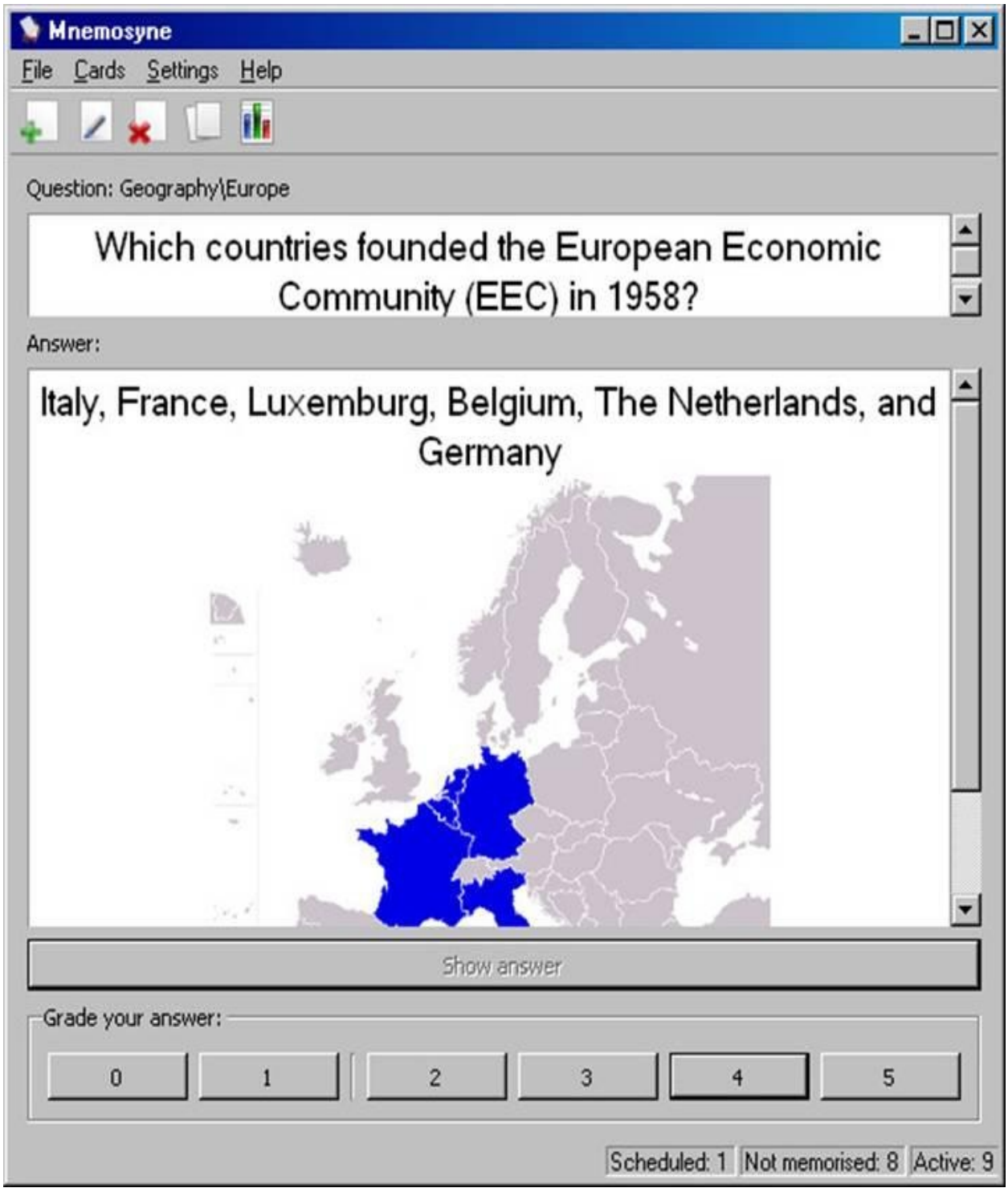
Based on a base schedule and the grade you give a card, the program automatically schedules the next review for that particular card. Every time you start the program, it automatically shows the flash cards due for review and asks you for your rating.

Let’s take a look at an example (Mnemosyne screenshots):

1. The program presents a flash card for review:


Mnemosyne
File Cards Settings Help
Question: Geography\Europe
Which countries founded the European Economic Community (EEC) in 1958?
Answer:
Show answer
Grade your answer:
0 1 2 3 4 5
Scheduled: 1 Not memorised: 8 Active: 9

2. You answer the card, click on “Show answer,” and compare your answer with the displayed answer:


Mnemosyne
File Cards Settings Help
Question: Geography\Europe
Which countries founded the European Economic Community (EEC) in 1958?
Answer:
Italy, France, Luxemburg, Belgium, The Netherlands, and Germany
Show answer
Grade your answer:
0 1 2 3 4 5
Scheduled: 1 Not memorised: 8 Active: 9

3. You rate your answer for this card (0–5), and the program automatically schedules the next review.

Here is a list of programs for your consideration:

Program	Paid/ Free	System
Anki	Free (except iPhone, iPad)	Windows, Linux, Mac, Android, iPhone, iPad
Mnemosyne	Free	Windows, Linux, Mac Mnemodomo for Android Mnemojojo for mobile phones
Supermemo	Commercial, older versions available as freeware	Windows, iPhone, iPad
Vtrain - Leitner Box program	Commercial	Windows

Which program should you use?

- Until very recently, I exclusively used Mnemosyne because it has enough features to keep me content, is very easy to use, and free.
- If you want to review on multiple devices (e.g., on a PC and an Android phone or iPhone), I highly recommend Anki, which is available for most common platforms. Anki smoothly synchronizes between different systems. In addition, Anki allows for a very sophisticated and flexible knowledge and flash card design that goes beyond traditional two-sided cards. These days, I use this program most of the time.
- On a Windows PC, all of the programs in the table above have their fans and can help you to memorize large amounts of information. Among them, Supermemo is still the program with the most features (a lot of them unique to Supermemo) and the most advanced scheduling algorithm.
- Vtrain follows the classical Leitner Box approach.

For all of the programs, libraries of ready-made flashcards are available. By all means, take a look at how other people make flash cards, and let them inspire you. However, I would still recommend you make your own flash cards. This will help you to learn how to best formulate knowledge in a way that suits learning – a very useful skill that is applicable way beyond making flash cards. Also, learning goes beyond flash card review. Someone else's flash cards might

only be a part of what that person uses to learn a body of knowledge.

For more information on how to make flash cards and flash card software, please check section (7.1) and *remembereverything.org/book-resources*.

7 Learning Foreign Language Vocabulary

I highly recommend learning a foreign language. You get to learn a useful skill, train your memory, and at the same time have fun. If you have the time, enroll in a language class and use the opportunity to socialize.

Learning vocabulary is a major part of learning a foreign language. This chapter is going to put some very effective tools into your hands to make learning foreign language vocabulary a breeze.

Let's start with some important guidelines:

In which direction should you learn foreign language vocabulary?

If you have ever learned vocabulary using a vocabulary list or flash cards, you probably wondered in which direction you should study the vocabulary. Should you look at (read) a foreign language word (FL-word), and quiz yourself on its meaning, or should you look at a word in your native language (NL), and try to produce the FL-word?

If your goal is to speak the language (i.e., active use), you should look at the NL-side of a flash card or vocabulary list, and try to produce the FL-word.

Why?

Producing and correctly pronouncing (and spelling) a foreign language word, given a word in your NL, is far more difficult than just guessing its meaning. But you have to cope with exactly this difficulty to express yourself. If you are in China and urgently need to find the train station, you have to say *huo-che-zhan* ( ). You think of something you want to express and then produce the FL-word.

Furthermore, research indicates that when people learn in the NL-to-FL direction, they still score quite well when being quizzed in the opposite

direction, that is, from FL to NL. On the other hand, people who have been trained only in the FL-to-NL direction tend to perform poorly when being quizzed from NL to FL.

What if you want to study vocabulary mainly for understanding and reading comprehension – that is, what if you only need to know the meaning of certain foreign language words?

In this case, consider studying from FL to NL since this is easier and going to allow you to memorize more vocabulary in the same amount of time.

Note: In an experiment involving native English speakers who were given French vocabulary to learn, participants who had learned in the direction of English to French (group 1) scored on par with participants who had learned in the direction of French to English (group 2) when they were quizzed from French to English. The participants in group 2, on the other hand, performed very poorly when they had to produce the French word, given an English word.[39]

This brings us to the third option: learning the vocabulary in both directions (combination learning), that is, from NL to FL and from FL to NL. This was tested in an experiment with Dutch students learning French vocabulary.

The most important finding in that experiment was:

Combination Learning (controlled for time) did not boost retention compared to studying only in a single direction if the quiz was in the same direction as the learning.[40]

What does this mean for your learning?

Suppose you have 15 minutes to study a list of words. If you are studying NL to FL and the quiz is also NL to FL, or you are studying FL to NL and the quiz is FL to NL, you are likely not getting a benefit by using part of your time to also study in the opposite direction.

How to achieve perfection in both directions?

Consider spending the bulk of your learning time in the NL-to-FL direction since it is the more difficult direction and also provides reasonable retention when being quizzed from FL to NL. So you could learn from NL to FL until you have mastered the new vocabulary items you want to learn. Then use a spaced review strategy (employing a flash card program), and test yourself in both directions, that is, from FL to NL and from NL to FL. The feedback you get this way will provide clear indication as to which words you need to review more.

This is relatively easy to do with modern flash card software. Most programs allow you to use a vocabulary card also in the opposite direction.

If you are using a vocabulary list for your learning, insert quiz sessions where you test yourself from NL to FL (covering the FL column) and sessions where you test yourself from FL to NL (covering the NL column).

Avoid learning groups of new words together that are related in their meaning.

In many textbooks, new words that belong to the same category, such as fruits, silverware, body parts, and clothing, synonyms of a given word, or words with an opposite meaning (such as fat and thin) are often presented together in a group.

This kind of grouping is called *semantic clustering*. A popular belief is that learning new words in a semantic cluster will improve retention of the words. Unfortunately, research indicates the opposite.[41] Learning a group of new words with related meanings tends to confuse.

For example, if you are studying the foreign language words for knife and fork at the same time, you are more likely to confuse one for the other and might try to employ tricks to avoid this confusion. This adds to vocabulary learning time and for quite a while leaves a trace of doubt.

In most cases, it is better to spread out the learning of semantically related words.

A better way of grouping new vocabulary is by using a natural story or theme. Consider the following short example (the new words are italicized):

I am standing on a hotel balcony in Thailand. Outside is a *coconut tree*. A monkey *on a leash* is climbing up the tree and *picking* coconuts.

Of course, by grouping words around a story/theme, you cannot always avoid learning related words together, but it is relatively easy to avoid a huge number of related words, such as all the months of the year or days of the week, appearing in one natural story.

If you use a textbook or are enrolled in a foreign language class, you likely have to live with the grouping of the vocabulary that the textbook author or instructor has created. But not all is lost – you can avoid confusing related words by using flash cards together with a spaced review schedule and spreading out the initial learning of words that are related in meaning over longer periods of time.

7.1 A Practical Method to Memorize Foreign Language Vocabulary

I am going to guide you through a practical method to learn foreign language vocabulary using the tools we have learned so far:

1. Spaced review using flashcards
2. Mnemonics, in particular the Keyword Method and a technique I call the *Enhanced Keyword Method*

If you are learning foreign language vocabulary during a language course, or while practicing with a tutor or language exchange partner, you are likely learning new words in context.

This could be a passage in a textbook, or a conversation about the events of the day with your language exchange partner. If you are learning from a book or in a class, you likely already have a vocabulary list, ideally together with at least one sentence in which the new word is used. When you are engaging in a conversation, note down words that you want to remember on a sheet of paper, and ask your language partner/tutor to give you some example phrases, sentences, or collocations.

Use as much of your tutor's or language partner's time as necessary to enable you to produce the correct pronunciation.

Committing new vocabulary to long-term memory:

1. Write new words on flash cards, with the FL-word (and its pronunciation) on one side and its meaning in your native language on the other side. Focus on one meaning for a given flash card. *(See below for detailed information on making good vocabulary cards.)*
2. Learn your new flash cards until you can successfully recall most of them. If you want to actively use a new FL-word, you need to be able to correctly

pronounce and spell it, given an NL-word or the actual object as a cue. Additionally, try to come up with one example phrase in which the FL-word is used.

3. Use the Keyword Method or the Enhanced Keyword Method (next section) for words that don't stick. *Notes: Some of the words are easy to remember, while a few won't stick even after several attempts using rote memorization or analyzing them. For those words, I suggest using mnemonics such as the Keyword Method (5.5), rhymes, or the Enhanced Keyword Method (7.2).*
4. Review the cards (by quizzing yourself) in increasing time intervals, using your favorite flash card program. If you don't have one, download Anki (ankisrs.net) or Mnemosyne (mnemosyne-proj.org). If you want to use paper-based index cards, use the Leitner Box System described in the last chapter.

How do you make good flash cards for vocabulary learning?

An FL-word might have several meanings in your own NL, and vice versa. If you are focusing on actively using a word, you are going to learn the word from NL to FL. In this case, I suggest that you concentrate on only one meaning on your flash card (the one you want to express).

As mentioned earlier, write the FL-word (and its pronunciation) on one side and the meaning you are focusing on in your native language on the other side. Add images as much as you can.

Tip: *Advanced programs like Mnemosyne and Anki allow for special vocabulary cards that automatically move notes and the pronunciation field (very useful for languages with a non-Latin script, such as Chinese, Japanese, Thai, etc.) to a card's answer side regardless of in which direction you are quizzing yourself. This way, the notes and pronunciation won't provide unwanted cues for the answer. The notes field can be used to note down phrases and collocations in which an FL-word is used. Additionally, you can add a mnemonic story that helps you to remember the FL-word to the notes field.*

With some exceptions, do the same if you are learning new words only for comprehension, that is, in the direction of FL to NL. Focus on the meaning that

is important in the current context. If you want to go a step further, find the underlying core meaning of a word as well, but don’t try to list all the different meanings of a word (neither NL nor FL) on one flash card. Doing this would make it very difficult to make a clear decision whether you got the meaning of a word right during review and would confuse you.

7.2 Enhanced Keyword Method

When learning a new language, you will find that most of the words are easy to remember, while a few are tough nuts. They don't want to stick even after several attempts using rote memorization or analyzing them. For those words, I suggest using mnemonics.

If you are learning from FL to NL, consider using the Keyword Method described earlier.

A better alternative, if you are studying from NL to FL, is the very similar *Enhanced Keyword Method*. It works especially well for concrete items. The Enhanced Keyword Method can be used in both directions, so you can also use it to learn from FL to NL.

Let me give you an example of how it works:

I am currently studying Khmer (the language spoken in Cambodia). Even after several reviews, I had trouble recalling the Khmer translation for the word *embassy*. So I chose a specific embassy building I know well as an anchor – the German embassy in Phnom Penh (the capital of Cambodia).

The Khmer word for embassy is *s'tan duut*. *S'tan* sounds to me like *Satan*. *Duut* – I associate with Satan blowing a trumpet – making a "*duut*" sound. I imagined Satan at the front gate of the German embassy in Phnom Penh, blowing his trumpet – making a "duut" sound. (Apparently, they don't want to let him in.)

When I want to know what *embassy* means in Khmer, I recall the German embassy in Phnom Penh. This reminds me of *Satan* standing in front the embassy making a "*duut*" sound – so *s'tan duut*.

Let's look at a second example:

The Khmer word for cup is *beyn*. I learned this by imagining London's Big *Ben* standing in my favorite coffee cup I use in Cambodia.

The main difference between the standard and the Enhanced Keyword Method is that the enhanced mnemonic calls for the use of *specific* objects (in this case the embassy in Phnom Penh vs. any embassy). The memory trace created with a specific object (preferably in the destination country) is likely going to be more unique and hence easier to recall.

Note: To use this method successfully, you have to additionally listen to and practice the correct pronunciation, preferably with a native speaker. If you do that, the mnemonic will help you to remember the word and pronounce it correctly.

Let's recap the steps:

1. Look at the NL-word for which you want to remember an FL-word. Think of a specific object in a specific location to represent the NL-word. If you are familiar with the country of the language you learn, use a location or object in that country! This becomes your *anchor* to which you later connect the FL-word. If you are not familiar with the country, use a picture dictionary or choose a specific city for each language you learn.
2. Look at the FL-word: What does it sound like in your NL? What NL-words are contained in the word?
3. Take the sound-alike words contained in the FL-word and visualize them.
4. Form an interactive image including your anchor and the visualized FL-word.

To recall the FL-word, just think of the NL-word and the destination country. This should trigger the recall of your anchor and thus the scene in which this anchor is linked to your FL-word.

Other ideas to find specific objects and locations to learn foreign language vocabulary using the Enhanced Keyword Method:

- Dominic O'Brien suggests to use a specific city for each language you learn.[42] If you already live in a city in the country whose language you want to learn, this city is an excellent choice (you can also use a specific city in your home country). There would be parks, streets, restaurants, gyms, a swimming pool, administrative buildings, etc., in short, many specific locations containing specific items to which you can connect FL-words that are difficult to remember. When I learned the Khmer words for specific body parts, I connected them to the real thing using my mental images of a few Cambodian friends – you don't have to tell them.
  Note: This method can be used for verbs and adjectives as well. For example, a person could be jogging along a familiar track in a park in your chosen city.
- In many languages, wonderful storybooks or picture dictionaries are available. They contain illustrations (e.g., a house with different rooms, a park, a gym, etc.). Since the storybook/picture dictionary is associated with a specific language, you can use the items as anchors for the Enhanced Keyword Method.

The use of the Keyword Method and Enhanced Keyword Method raises several questions I would like to address:

1. Doesn't the use of the Keyword Method lead to a slow translation process, which hinders an effective use of the newly acquired vocabulary?
   My personal experience and research indicate that if you actively use the vocabulary, for example, in your daily communication or through spaced review as described earlier, you only tend to rely on the mnemonic temporarily. The mnemonic is a powerful and enjoyable tool to help you get over the memorization hurdle and is later replaced by a more direct association.
2. Do I still have to review the words using my flash card program if I use mnemonics?
   Although words you learned using mnemonics tend to be remembered longer, to keep them, you have to use them. One way of using them is by practicing recall with your flash card program.
3. Should I use mnemonics to learn all new vocabulary?
   It takes time to find a keyword and create a mnemonic image, so I would only use mnemonics to learn vocabulary that doesn't want to stick. For

most of the words, you can do very well using only spaced review with flash cards. That being said, there are several language courses which already contain ready-made keyword images, including a series created by Dr. Michael Gruneberg, a prominent researcher in the field of language learning using the Keyword Method.

8 Mental Filing Systems

Mental filing systems are mnemonic systems that allow you to store all kinds of information in order.

You can use them to give speeches without notes, memorize the key information of something you read, hear, or watch, maintain a fact file for a large number of facts, or memorize all steps of a procedure.

Mental filing systems allow you to remember what you need to do, memorize shopping lists, and capture ideas. Learning a mental filing system like the Method of Loci allows you to use your memory in ways you likely never thought possible.

Most mental filing systems are so-called *peg systems*. Unlike in the Link System introduced earlier, where you have to go through all preceding items to access a particular piece of information, in a peg system you can directly access individual items. You also have no risk of "losing" other items, should you not remember a particular item.

In a peg system, you associate new information you want to remember with a previously memorized ordered list of *pegs*, or *locations* along a journey you know well. The pegs are concrete things that are easy to visualize and remember.

How does it work?

To create a peg system, you first have to memorize pegs or locations in a fixed sequence (for example, numbered from 0–10). You only do this once, that is, the pegs can be reused.

When you want to store a piece of information, you just associate it with a peg by creating a vivid image and/or making up a sentence that includes both the peg and the item you want to remember.

How do you recall the information?

By recalling a peg (your cue), you can recall the item you have “stored” under this peg. By following the order of the pegs, you can also recall all the items in sequence.

Given an item, you can normally also recall the peg the item is attached to and the peg’s order number.

8.1 The Number Rhyme System

A very useful and easy-to-learn peg system is the *Number Rhyme System*, which already dates back more than 200 years.

In the Number Rhyme System, you convert the numbers from 0–10 into rhyming words. I use the following words and objects:

		Peg Item	Alternatives
0	Zero	Hero	Nero
1	One	Bun	Gun, Sun
2	Two	Shoe	Glue, Zoo
3	Three	Tree	Bee, Sea
4	Four	Door	Store
5	Five	Knife	Hive, Wife
6	Six	Pigs	Bricks, Sticks
7	Seven	Heaven	Leaven
8	Eight	Gate	Plate, Skate
9	Nine	Wine	Mine, Sign, Stein
10	Ten	Hen	Pen

After reading the list, try to recreate it from your memory by recalling each number and the word it rhymes with:

Zero – hero

One – bun

Two – shoe…

Next, imagine each of the peg items as vividly as possible. Make it outstanding and unique. It should be attractive, so use colors, smell it…

For example, in the table above, zero is a hero: I see Superman in my mind's eye. He is wearing his blue costume and red cape. One is a bun – and for me, an oversized hamburger bun with white and black sesame seeds. Can you smell it? Two is a shoe. I see brown cowboy boots with spores. I can smell the leather. Or

maybe you want red shoes with extremely high heels…

Create a vivid picture for each of the objects in your mind.

Then practice by going from 0 to 10 and recalling each rhyming word and the associated image.

Once you can recall the words and images with ease, your memory system is ready.

You now have a memory filing system with 11 pegs you can use to store pieces of information.

Let's practice using the Number Rhyme System. Memorize the following 11 items by following the visualizations below:

1. Television
2. Meeting
3. Truck
4. Can of Budweiser beer
5. Chopsticks
6. Email
7. New York City
8. Pickup truck
9. Notebook computer
10. Public speaker
11. Parasol

You start with 0->zero and associate Superman with a television:

Zero->hero: Superman appears in your mind's eye. He is flying out of a gigantic flat screen *TV* and standing right in front of you.

One->bun: I imagine a *meeting* of hamburger buns. The buns are opening up in the middle and chatting to each other. They are making jokes and are laughing.

Two->shoe: A handsome looking trucker with cowboy boots is climbing on his *truck*.

Three->tree: I imagine a huge tree with *cans of Budweiser Beer* as fruits. One can is falling down and explodes.

Four->door: My front door is made of thousands of white and brown *chopsticks*.

Five->knife: I use my butcher's knife to open a letter. On the letter is a large **@**-sign (*email*).

Six->pigs: I imagine the Statue of Liberty as a huge pink pig standing upright. As ships are passing by, it grunts happily (*New York City*).

Seven->heaven: A blue Ford *pickup truck* is flying by on a cloud. An angel is sitting at the steering wheel.

Eight->gate: The gate in front of my university has turned into a huge *notebook*.

Nine->wine: A visibly intoxicated *public speaker* is holding a glass of red wine in his right hand. With his left hand, he is trying to hold on to his microphone stand.

Ten->hen: A hen is lying on a deck chair under a *parasol*. She is sipping a Pina Colada.

Create the images in your mind then pause for a minute. Recall item number 3.

Yes, that is a tree, and the fruits are Budweiser Beer cans.

Recall all items from 0 to 10. How many could you recall? Chances are, you

could recall all 11. If not, just strengthen the associations between the items and pegs you couldn’t recall.

***Tips*:**

- If you speak several languages, you can create a Number Rhyme peg list for each language you speak.
- You can extend the Number Rhyme System to 20 by finding concrete rhyming words for the numbers 11 to 20. Several rhyming dictionaries are available on the Internet to find suitable objects. (For website links, please check *remembereverything.org/book-resources*.)
- Sometimes, you may have trouble creating an interactive image to store a piece of information. In this case, make up a sentence including the peg.

What can you use the Number Rhyme System for?

You can use it to store any list of 11 items in order. I use it to memorize things I need to do and ideas I have (especially when I cannot write them down). I also use it for shopping lists. A capacity of 11 items is normally also enough to remember the key points of a shorter speech or presentation.

8.2 The Number Shape System

A very similar peg system is the *Number Shape System*.

In the Number Rhyme System, you asked yourself, “What does this number rhyme with?” In the Number Shape System, you look at the shape of each number and ask yourself, “What object does the shape of this number remind me of?” That object becomes your peg, and you can use it exactly as the pegs in the Number Rhyme System.

Again, imagine each object as vividly as possible. Make it outstanding and unique. It should be attractive, use colors, smell it…

What does the number 0 remind you of? Maybe an American football? What is its color? Is it new?

How about the number 1?

It is best to use whatever comes up in your mind when you look at a particular number. The following table provides some suggestions:

	Peg Item	**Alternatives**
0	Football	Egg, Ring, Tire
1	Candle	Pencil, Arrow
2	Swan	Goose
3	Handcuffs	Breasts, Butterfly
4	Sailboat	Flag
5	Hook	Wheel chair
6	Elephant’s trunk	Golf club
7	Axe	Street lamp
8	Snowman	Egg timer, Race track
9	Balloon and string	Tennis racket
10	Knife and plate	Baseball bat and ball

After choosing and visualizing your pegs, you can use the Number Shape

System in exactly the same way as the Number Rhyme System.

Memorizing numbers using the Number Shape System

Apart from using it as a filing system, you can use the Number Shape System, as well as the Number Rhyme System, to convert the numbers from 0 to 10 into images. This makes the digits much easier to remember.

I suggest you choose one of the two systems as a filing system and use the other one to memorize numbers. To memorize longer numbers, you convert each digit into an object and then link the objects together or weave them into a story.

For example, let’s say, you want to remember your ATM pin code. Your pin code is 3249.

Using my preferred images, we get handcuffs, swan, sailboat, and balloon and string.

Now imagine you are standing in front of your local bank branch (the location you want to link your ATM pin to). Out of the bank comes a handcuffed unshaven robber being pecked by a huge swan wearing a police cap. The swan is pulling a sailboat that is being lifted up in the air by a balloon bundle.

Do you get the picture?

When you later want to recall the number, imagine yourself at your bank branch and let the image sequence come back. Then just go through the linked list, and convert each item back into the number it represents.

8.3 The Method of Loci – Memory Palaces and Journeys

Do you feel that a filing system with 11 items is too limiting? While you will be surprised how many problems you can solve with just 11 reliable storage locations, the number of storage locations in the following system is only limited by your imagination.

To this day, the *Method of Loci* is probably the most powerful and flexible mnemonic filing system there is. It is used by many of the participants in memory championships. The competitors use it to memorize and recall hundreds of items in order.

The Method of Loci is a memory system that dates back to the ancient Greeks and Romans. Roman orators used the Method of Loci to remember speeches lasting for several hours.

During the times of the Greeks and Romans, it wasn't that easy to write down a speech you wanted to give. Also, reading speeches to an audience was not highly regarded. In fact, even today, a speaker who talks freely without referring to her/his notes impresses most people. Imagine, you are facing an audience and giving a 30-minute talk to the point, completely without using notes.

To memorize their speeches, the Romans pegged the key ideas to locations along a familiar journey. The journey could be a mental walk through different rooms in a house (a *Memory Palace*), or a familiar route through a park or city. When they gave a speech, they just mentally walked along their journey, and as they passed by each predefined location, they retrieved the image representing the next key idea in sequence.

As you may have already noticed, the Method of Loci is essentially a peg system. The pegs are the locations, and the order is provided by defining a precise journey along a familiar route. Like with any journey, you have to define a fixed starting point.

To create our first journey, let me introduce the hotel room I am currently in:

I imagine myself entering through the door and then turning right, walking around the circumference of the room until I am back at the door. The first object I pass by is an armchair, so I choose this as the starting point. Second is a brown bamboo shelf – my second location. Third is a bedside locker, followed by my bed. Next to the bed is a blue standing fan… Following around the circumference of my bedroom, I have identified 10 locations:

1. Armchair
2. Bamboo shelf
3. Bedside locker
4. Bed
5. Blue standing fan
6. Desk with a printer on it
7. Small table
8. Dresser with mirror
9. TV table with TV
10. Wardrobe

This gives me 10 locations I can use as pegs to memorize 10 items.

Notes:

- I mentally walk through my journey a couple of times to make sure I always use the same locations in the same order.
- I use distinct items along my journey.

Now I can use my room to memorize my to-do list for the day.

1. Find a rental house.
2. Buy a charger for my mobile phone.
3. Cut up some of my credit cards to better control my finances.
4. Call my friend Momse.

5. Pay the monthly garbage fee.
6. Give the apartment key to my friend Tom.
7. Buy toothpaste.
8. Teach my friend's daughter Jing Jing the ABC.
9. Make an appointment with my doctor.
10. Buy Apple shares – the company that makes the iPhone and iPad.

Here is how I memorize the list:

1. For the first item on my to-do list, I visualize myself placing a house on the armchair. The house is quite heavy, so the armchair breaks, and the house is standing on the flattened armchair.
2. My second location is the brown bamboo shelf, and my second task is to buy a new charger for my mobile phone. I imagine chargers, flashing in different colors, hanging from the bamboo shelf.
3. The third location is my bedside locker, and the corresponding task is cutting up those credit cards. I imagine credit card shreds sticking out from the top of my bedside locker like pieces of glass. I accidentally try to sit on the locker. Ouch, the shreds hurt.
4. …

I think, by now you get the idea.

Exercise: I suggest you create your own journey and memorize the above to-do list.

Take the room you are currently in, or the room you are most familiar with. Imagine you are entering the room and then turning right. Now follow the circumference of the room and identify 10 distinct items that can serve as locations.

Mentally walk through your journey a couple of times to make sure it is firmly committed to memory.

Now memorize the above to-do list by visualizing the to-do items interacting with the different locations in your room.

How are you doing?

Note: Create memorable images by making them interactive, vivid, and unique. You can also use smell, sound, and logic. Ask yourself, "Why is the item there?"

How can you create a complete Memory Palace?

To get more locations, we just go to the next room and again identify objects that can serve as locations. Proceeding in this way for a whole house, we can create a complete Memory Palace.

I suggest you always follow the same order when identifying items in a room that you want to use as locations. For example, after entering a room, you could always turn right and then follow the circumference of the room.

You want to use your home as a Memory Palace?

For the overall journey through your house (that is, from room to room), follow a fixed order. For example, make your front door your starting point and then use *your* natural route through your house, proceeding from room to room.

Exercise: Use your house or apartment to create a Memory Palace with at least 20 locations. Identify five distinct locations in each room.

Suggestions:

- Use the same number of locations in each room. This makes it easy to keep track of each location's number. A good number is five items for each room.
- Use distinct items as locations. For example, don't use four desks, six beds, and five wardrobes as locations. Using distinct items makes it much easier

to distinguish the different locations and to create unique associations.
- If you don’t have enough rooms, create some more in your imagination.

How can you create other Memory Palaces if you need more filing systems and storage locations?

The capacity of a Memory Palace is only limited by your imagination. A well-organized palace can have hundreds of storage locations.

As mentioned earlier, you are not limited to your house or any specific building when designing a Memory Palace as a mental filing system.

When designing your palace, keep the following three points in mind:

1. Create enough distinct locations for what you want to remember.
2. Make sure that you can memorize your journey in a precise order and easily follow it on subsequent mental walks.
3. It is easier to manage a Memory Palace if you define the same number of storage locations in each room. Go for either 5 or 10 locations per room.

How about taking a mental walk through your hometown?

As I leave my house, I pass by a gym, a car dealer, my hairdresser, my local supermarket, a bakery shop, the fountain in the middle of the city, the Post Office, the Italian restaurant, City Hall, a hotel, a gas station, and the train station.

Voila, I have a memory filing system with twelve places.

Again, if I need a Memory Palace with more storage capacity, I walk into the different places on my journey around town and identify, let’s say, five distinct locations in each place. (Consequently, the walk through my hometown results in a Memory Palace with 60 different locations.)

It might be a bit odd if you just walked into your Italian restaurant, sniffed around, maybe even took pictures, and then walked out again. So, combine it with a nice dinner. While eating your Fettuccini Alfredo, take in the layout of the restaurant and make yourself familiar with details. What pictures are hanging from the walls? How about the tables? Are they made of wood? How about the lamps?

Back home, let the restaurant reappear in your mind's eye. Visualize it as detailed as you can. Then make a simple sketch of the layout. Finally, identify five locations in the restaurant that you want to use as pegs. (To get a precise order of locations within a room, I always turn right and then mentally follow the circumference.)

Firmly commit the precise order of the locations to your memory. I did this for all 12 places to get my 60-location Memory Palace.

Other ideas for creating journeys:

- Your office, your school
- Any building or apartment you can make yourself familiar with
- Parks
- A train journey around your country – Pick a landmark for each of the cities you pass through.
- A different city
- A different country
- A videogame
- A picture book

Virtual memory palaces and journeys work as well. How about creating a castle completely in your mind or the house of your dreams by the sea?

Take a sheet of paper, and make a sketch of the layout and the different rooms in your dream house. Include a nice garden with several distinct features.

Internet Resources that can help you, so that you never run out of locations:

(For website links, please check remembereverything.org/book-resources.)

- **Google Earth or Google Maps with Street View**
  Take a walk through a city with Google Maps, and identify the locations you want to use. You can use Google Images or 360 cities (a website with interactive panoramic images) to make yourself familiar with the locations.
- **City Maps, Tourist Maps**
  Identify distinct spots on a map; then again use Google Images and Google Street View to see the locations.
- **360 cities**
  360 cities is a website with interactive panoramic images and virtual tours. This website is a great resource.
- **Architectural Digest**
  Architectural Digest has wonderful images of apartment designs, houses, *etc.*

Can I reuse my journeys and memory palaces?

Yes, you can. If you no longer need the information you have stored or can recall it without resorting to your journey, you can recycle the freed journey. However, give it a few days, to reduce interference from shadow images stemming from information previously stored. This is particularly useful for journeys you use to store information you only need for a limited time, such as a shopping list or a to-do list.

What are good applications for the Method of Loci?

I use memory palaces and journeys to remember the key information when giving a presentation, reading an article or a book chapter, or following a lecture or documentary. Every main idea gets a location along a predefined journey. If necessary, I connect details to the main idea using the Link System.

Another wonderful application is the storage of complete fact files.

For example, let’s say you want to memorize the historic expansion of the European Union using the Method of Loci: Every milestone gets one location where you store the year plus the countries that joined the EU in that particular year. To remember the years and numbers, you need to convert them into images as well. A powerful way to do this is the Phonetic Number System described in the next chapter.

To memorize all presidents of the U.S. together with the information when they became president, you can use the same procedure: Convert each president’s name into a memorable substitute, and visualize the substitute together with a particular location. Additionally, associate the year when he became president with this compound image.

The possible applications for the Method of Loci are endless, and since you can always create another Memory Palace, you won’t run out of “storage.”

You can of course also use it for your daily memory needs, such as to-do lists, shopping lists, idea lists, steps in a procedure, *etc.* Just create a different journey for each application. If you only want to learn one mnemonic filing system, make it the Method of Loci.

Finally, yet importantly, the Method of Loci in combination with a system to translate numbers to images is also used by competitors in memory championships to memorize numbers with hundreds of digits and complete decks of cards in order.

8.4 Memorizing Several Pieces of Information in One Location

In the following, we are going to use the Method of Loci together with the Link System to memorize the 50 states of the U.S. in alphabetical order and the state capital for each of the 50 states.

Together this amounts to 100 pieces of information.

First, we have to decide on a journey. We have 50 states, so we could use a journey with 50 locations. If you want to memorize a lot of additional information for each state, such as its capital, population, GDP, largest city, etc., by all means, create a journey with 50 distinct locations.

I am only interested in the states and their capitals, so a journey made up of ten locations plus a small trick will do: in each location, we "store" five states using the Link System.

Since we are talking about the United States of America, I will place the journey in the U.S.

Suppose we are taking a walk through Central Park in New York City.

Start from the south entrance at Columbus Circle.

Entering Central Park, we walk by the Golden Maine Statue, our first location. There is a playground (Hecksher Playground). This becomes our second location…

Walking from south to north, you could design the following journey:

1. Columbus Circle Entrance – Golden Maine Statue
2. Hecksher Playground
3. The Zoo – Penguins
4. Sheep Meadow

5. Strawberry Fields – The John Lennon Memorial
6. Bethseda Terrace – The Fountain
7. Delacorte Theater – Stage of the Theater
8. Great Lawn
9. Obelisk – Cleopatra's Needle
10. Metropolitan Museum

You have never been to Central Park? Maybe you have no idea what these places look like?

A wonderful website that allows us to go to Central Park without boarding any airplane is again Google Maps with Street View.

Go to Google Maps and type 'Central Park, New York, NY, United States'. Find Columbus Circle. Use the map to get an overview of the route described above. At each of the locations zoom in, until you get a clear picture of the location. Choose a distinctive feature at each location.

If you don't want to use Google Maps, or Street View doesn't display anything of interest, there is another way:

Find a map of Central Park and print it out. Mark the locations for your journey, and then go to Google Images (on the Google website click on Images) to find out what these places look like. Voila, you have your journey through Central Park.

Next, we have to create a substitute item for each of the 50 states. Create a table of the 50 states in alphabetical order. (You can find a table by searching Wikipedia for "List of U.S. States.")

Starting with Alabama, look at each of the 50 state names.

What does the name remind you of? Use this as your substitute item.

Note: For help on how to translate abstract nouns into concrete items, please

recheck the section "Substituting Concrete Items for Abstract Terms" (5.4).

Well, Alabama reminds me of an *Arab*. So, I use Arab as a substitute. Being German, Alaska sounds to me like "a Lastcar" – *Lastwagen*, which in English is a truck. I use "a lastcar" in place of Alaska. Arizona reminds me of the *sun*, Arkansas of an *arc*, California of *cauliflower*…

We are going to "store" these five states in the first location. Yes, in each location we store five states, so we end up with 50 states in total.

Here are my associations for the first five states. Our first location is the Golden Maine Statue:

1. I imagine an Arab riding the Golden Maine (Alabama).
2. The Arab is flying through the air, pulling a "lastcar" behind him (Alaska).
3. The sun melts the wax-made "lastcar." Only a heap of wax is left (Arizona).
4. The sun is a gas-filled balloon that is tied to a gigantic arc, so it cannot fly away (Arkansas).
5. From the arc also hang cauliflower heads. Someone wants to dry them (California).

See, we have associated the first state with the location, the second state with the first, the third with the second, *etc.* and thus "stored" the first five states in the first location.

Now we can try to recall them:

Our first location is the Golden Maine Statue at the entrance of Central Park.

Do you remember?

An Arab is riding the Golden Maine->Alabama.

The Arab is pulling a “lastcar”->Alaska.

The sun is melting down the “lastcar”->Arizona.

The sun cannot fly away because it is tied to an arc->Arkansas.

Cauliflower heads are hanging from the arc->California.

In general, to recall the states at a particular location, we just recall the location and start following our linked list of items. We know there must be five items.

To store the states from six to ten, we proceed to the second location, the playground. Link your sixth state’s substitute image to the playground. Then associate the sixth with the seventh state, the seventh state with the eighth, and so on.

Again, try to recall them.

Then proceed to the third location, the zoo. Associate the eleventh state with the zoo, the twelve with the eleventh…

After you have completed your journey of 10 locations, you have stored 10 × 5 states (= 50 states).

You can now recall all 50 states by just mentally walking through the locations of your journey, recalling five states for each location and then proceeding to the next one.

Excerpt of the table:

Name	Subs.	Location	Assoc.	Capital
Alabama	Arab	Entrance Golden Maine	Arab riding the Golden Maine	Montgomery
Alaska	A Lastcar	Entrance Golden Maine	Arab pulling a flying truck	Juneau
Arizona	Sun	Entrance Golden Maine	The sun is melting a wax made "Lastcar"	Phoenix
Arkansas	Arc	Entrance Golden Maine	The sun is tied to a giant arc	Little Rock
California	Cauliflower	Entrance Golden Maine	Cauliflowers are hanging from the arc	Sacramento

Let me stress again that it is important that you create your own substitute items and associations. By doing this, you are practicing an important skill, and you use images and associations that work for you.

Try it – it is easier done than described.

Now for the states' capitals:

To begin, take a look at each city name and let it guide you to a substitute item. Create substitute items for all the state capitals. Then link each capital city to its state by creating a unique image that combines the two:

My substitute item for Montgomery, Alabama's capital, is chewing gum. So I imagine my Arab chewing gum.

Alaska's state capital is Juneau, so Ms. June is riding on the back of a "lastcar."

Arkansas's capital is Little Rock; hence, I imagine my massive arc built on a

heap of little rocks…

Proceed in this way; that is, create substitute items for the first five state capitals and associate each of them with “their” state. Then try to recall the first five states and their capitals.

If you have missed a capital, strengthen the association between the state’s substitute item and the capital’s substitute by having them interact in a more interesting way. Create vivid and unique images whenever you can. Support this by also linking them verbally in a sentence. Use Google Images if you can’t create a clear picture in your mind for a particular item.

Do have your first five capitals?

Okay, continue with the second group of five capitals and try to recall them. Then go to the third group… Proceed in this way until you have associated all 50 states with *their* capitals.

Now go on a final stroll through Central Park, recalling the states and their capitals.

Congratulations!

You have accomplished something that is quite difficult to achieve with rote memorization. Besides, rote memorization always leaves doubts: Have I forgotten any one of the states? At the end, you mull over your list with 47 states and wonder which ones are missing. By using a journey and substitute items, it is easy to keep track and know exactly when you have recalled all states and the corresponding capitals. There are five states in each location, so if you have your five states, you can move on to the next location.

9 Making Numbers Memorable

In the chapter “Mental Filing Systems” (8), we used the Number Shape System to convert single digits into images.

Do you remember? 0 is an American football, 1 is a candle, 2 is a swan, 3 are handcuffs, and so on.

By asking ourselves what shape a number resembles, we can create an image for each of the digits. Subsequently, when we want to memorize a multiple-digit number, we just convert each digit into its image and connect two adjacent digits by creating an interactive composite image containing the two number images. For example, to remember bus line number 20, imagine an angry swan (2) throwing a football (0) at a departing bus.

This works fine for shorter numbers, but is rather slow and limited to numbers with a few digits (for example, ATM pin codes).

If we want to memorize a 10-digit phone number, we already have to create 10 linked images or a story containing these images. As an alternative, we could place the digit images on a journey using the Method of Loci. This works quite well, but requires that we create a new journey for each number, so using journeys is really only practical to remember a few very important numbers.

To reduce the number of images and thus make it easier and much faster to memorize larger numbers, masters of memory convert two or even three-digit numbers into one image instead of using single-digit images. By then placing these images on a journey, they can accomplish feats like memorizing the first 100, perhaps 500 digits of Pi (or any other number).

Using the techniques presented in this book, I am confident you can do the same if you wish.

In 2006, Chinese student Lu Chao memorized and correctly recalled the first

67890 digits of Pi.[43] For everyday life, this certainly sounds a bit excessive. However, there are many instances when we want to remember historical dates, phone numbers, pin codes, mathematical or technical constants, *etc.*

Methods to efficiently memorize numbers have been used for at least 400 years and have a wide range of applications. Besides, they are fun to learn and use. You might find yourself looking for numbers to memorize at every billboard and license plate.

In the following, I am going to introduce two methods to memorize numbers:

- The Phonetic Number System (converts numbers into concrete objects)
- The Dominic System (converts numbers into people and actions)

Both systems involve some preparation though, so I suggest you spread out your learning over at least two weeks for each system. We are talking about 15 to 20 minutes a day.

For both systems, you eventually need to memorize images for the numbers from 0 to 99, so if you learn 10 numbers per day, the task becomes quite manageable.

To make your learning systematic, I suggest that you use flash cards, either paper index cards or a program (for example, Anki or Mnemosyne), to learn and quiz yourself on the numbers. (Check the chapter “Spaced Review, Flashy Cards, and SPRIT” for details [6].) In addition, practice converting numbers whenever you encounter them.

Which system should you use?

The Phonetic Number System is more versatile and needs less work to get started with. It does all the tricks you need for everyday number memory, so I suggest you start with the Phonetic System.

The Dominic System, on the other hand, is more powerful when it comes to memorizing very large numbers or playing cards. Also, because it uses famous persons and actions, it may appeal to you if you find it easier to remember people rather than objects.

So, if you struggle with the Phonetic Number System, try the Dominic System.

9.1 The Phonetic Number System

You have just gotten the phone number of that beautiful girl at the checkout or that handsome barrister at your local coffee shop. Chances are that without writing it down, you will soon have forgotten it.

Normally, longer numbers are difficult to memorize and easy to forget. The main reason for this is that for most people numbers are abstract. For many of us they are downright boring.

So how can you make numbers more interesting and memorable? How can you make memorizing numbers fun?

Well, as shown in the Number Shape System, single-digit numbers become easy to remember by converting them into an image. But, how about 2, 4, 8, 10 digits, 100 digits? Using the Number Shape System, memorizing 12-digit numbers is not exactly an easy feat.

What if you could create exciting images and scenes for larger numbers?

This is exactly what you can do with the *Phonetic Number System* (also called Phonetic System). The origin of the system goes back more than 300 years to German author Stanislaus Mink von Weunsshem (aka Johann Just Winckelmann; for spellings, also see WorldCat.org) who described a consonant number system in 1648.[44]

Don’t be deterred by the strange name or the age of the system. There have always been people who thought outside the box, and “Mr. Stanislaus” came up with a really creative solution to the problem of memorizing numbers. Maybe his number memory wasn’t all that good either. The system itself has been improved and refined by others, who followed in his footsteps. It is quite up to date and has lost nothing of its power.

Using the Phonetic Number System, memorizing 12-digit numbers is easy, and

after a bit of training, I bet you can memorize the first 100 digits of Pi, if you wish to do so.

Learning it takes a bit of practice, but by using the Internet and a few small software tools, it really is a lot of fun.

How does it work?

In brief, the Phonetic System converts each of the digits from 0 to 9 into a consonant sound. The consonant sounds are then used to form words or phrases, which can be visualized.

This is how the Phonetic System works:

1. Using the following table, we translate digits into consonant sounds:

Number	Sound
0	s
1	t, d
2	n
3	m
4	r
5	l
6	j, ch, sh
7	k, g
8	f
9	b, p

2. We use these consonant sounds to create words and phrases that can easily be visualized. Vowels and the consonant sounds w, h, and y have no number assigned to them and hence can be used between valid consonant sounds to form words.
3. When we later want to recall a number, we just have to recall these words/phrases and use their consonant sounds to recreate the number.

Here is an example:

Christopher Columbus went on his first voyage in 1492 and reached the Bahamas (by accident). Following the table above, 1492 becomes t…r…b…n.

Now ask yourself, “What words could I form using these consonant sounds?”

How about **t** u **r b** a **n**?

To remember the year 1492, we could imagine Columbus on his ship having a turban on his head.

Or, if you like this one better, Christopher Columbus’ ship is powered by a **t** u **r b** i **n** e.

To recall the number, you just have to remember that Columbus was wearing a *turban*; then take each consonant sound in the word turban, and translate it back into the corresponding digit. In the example, t is 1, r is 4, b is 9, and n is 2, so the number is 1492.

As a second example, let’s try my friend Bob’s phone number. It is a 9-digit number, 380131497.

Again, using the table, we get: m f s t m t r b k.

That could be **m**y **f**a**st m**o**t**o**r**b**i**k**e.

To remember this number, I just imagine my fast motorbike crashing into Bob’s front door.

To recall Bob’s number, I just have to recall the phrase *my fast motorbike* and convert the consonants in the phrase back into the digits.

Exercise: Before we continue, you have to memorize the consonant-sound table to make sure you can convert each digit into a consonant.

Num	Sound	Hint
0	s	zero starts with the sound s
1	t, d	t has one down stroke
2	n	n has two down strokes
3	m	m has three down strokes
4	r	r is the last letter in the word four
5	l	l is 50 in Roman numerals
6	j, ch, sh	
7	k, g	
8	f	
9	b, p	b rotated by 180 degrees looks like a 9

How to best memorize the table:

- I have added an additional column with a hint to help you memorize the first consonant sound for most numbers.
- For some digits, several consonants are used. An easy way to remember the additional consonants is to memorize the first consonant and to keep in mind that the additional consonants are pronounced by keeping tongue and lips in the same position: For example, pronounce t and d. Now try j, ch, and sh. The same applies to k and g, and to b and p.

Let me emphasize that the table is about consonant sounds rather than spelling. This is easier to understand by looking at a few examples:

s: The s in seal and the z in zero are pronounced the same way, so they both represent the sound s. The same goes for zebra, czar, and ceiling.

j: The j in jet and dg in hedge are also pronounced in the same way, so they both represent the sound j.

f: The f in face and the v in sieve are pronounced as an f, so they both represent the consonant sound f.

k: The c in Mac and in can is pronounced like a k, so it represents a k. The same goes for the q in quality.

Tips:

- *When converting numbers into consonant sounds and then words or phrases, it is best to use words or phrases that can easily be visualized. However, even a phrase that cannot be easily visualized is normally easier to remember than a number.*
- *Double occurrence of a consonant sound counts as a single consonant. For example, ball is 95, not 955, and rock is 47, not 477.*
- *Silent consonants are not counted. So knee is 2, not 72, and gnome is 23, not 723.*

Exercise:

Create words for the one-and two-digit numbers in the table below. Try to come up with words that are easy to visualize.

Num	Cons	Word
1	t	hat
14	t r	tire
30	m...s	.....
49	.....	.....
57	.....	.....
2	.....	.....
86	.....	.....

(Note that h has no number assigned to it.)

How to do this fast when you have no time?

You may have noticed that for some numbers it is easy to find matching words or phrases while for others it takes a bit of time. If you only use the system when

you have ample time to convert a number, this is not a problem.

To convert numbers fast into words and images, I suggest that you pre-memorize words and the corresponding images for one-and two-digit numbers, so essentially from 0 to 99. When you later want to memorize larger numbers fast, you can split them into digit pairs, recall the pre-memorized word and image for each digit pair, and use the Link System, a composite image, or a story to memorize the digit pairs in order.

Exercise pre-memorization:

Create a word for each of the numbers from 0 to 99. Use a word that can easily be visualized, and visualize the word.

I suggest you memorize 10 words per day and use a flash card program to quiz yourself and keep track. Start with the numbers 0 to 9 on day 1, 10 to 19 on day 2, and so on.

Num	Consonant sounds	Word
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
..		
99		

Important tips for the pre-memorization exercise:

- *It is better to start with the same consonant sounds when pre-memorizing words for subsequent numbers. This makes it easier to memorize them and recall them in a sequence (because you don't have to change the cue when recalling in sequence). Let me illustrate this with an example: The numbers 30, 31, and 32 can be converted into mouse, mat, and moon. These words start with the same consonant sound and hence allow you to recall them in sequence with ease. While you could also use mouse, humid, woman, that is, start with a different consonant sound for each subsequent number, I would advise against it.*
- *For some of the two-digit numbers, it may be difficult to find a word that is easy to visualize and uses the same starting consonant sound as its neighbors. In this case, make an exception.*
- *Use the first suitable word that comes to mind. If you cannot find a suitable word, look at my table below.*
- *It is important that you create an image of each word in your mind. If you don't know what something looks like (e.g., a cam), just type the word in Google Images.*
- *If you don't like a word in the table, try the free software tool "2know" (got2know.net) to come up with alternatives. The program is available in English, French, and German. (For website links, please check remembereverything.org/book-resources.)*

Author's table (Number-Consonant Sounds-Word):

0–h s–house
1–h t–hat
2–h n–honey
3–h m–ham
4–h r–hair
5–h l–hill
6–h j–hedge
7–h k–hawk
8–h f–hoof
9–h p–hippo
10–d s–dice
11–t t–tooth
12–t n–ton
13–d m–dome

14–t r–tire
15–t l–tail
16–t sh–tissue
17–d g–dog
18–t f–tofu
19–t b–tub
20–n s–nose
21–n t–net
22–n n –nun
23–n m–gnome
24–n r–hanger
25–n l–nail
26–n j–hinge
27–n k–Nokia (classical mobile phone)
28–n f–knife
29–n b–knob
30–m s–mouse
31–m t–mat
32–m n–moon
33–m m–mummy
34–m r–hammer
35–m l–mill
36–m ch–match
37–m k–Mac (Apple Macintosh)
38–m f–muff
39–m p–mop
40–r s–rice
41–r d–radio
42–r n–ruin
43–r m–ram
44–r r–horror (Frankenstein)
45–r l–rail
46–r ch–arch
47–r k–rock
48–r f–reef
49–r p–rope
50–l s–lace
51–l t–light
52–l n–lawn

53–l m–llama
54–l r–lure
55–l l–lily
56–l sh–leash
57–l g–leg
58–l f–leaf
59–l p–lip
60–ch s–chess
61–j t–jet
62–ch n–chain
63–j m–jam
64–ch r–chair
65–sh l–shell
66–j j–judge
67–j k–jockey
68–sh f–chef
69–sh p–sheep
70–g s–goose
71–k t–kite
72–k n–can
73–k m–cam (camshaft)
74–k r–car
75–k l–coil
76–k j–cage
77–k k–cock
78–k f–cave
79–k p–cup
80–f s–face
81–f t–foot
82–f n–fan
83–f m–foam
84–f r–fur
85–f l–foil
86–f j–fudge
87–f g–fag (cigarette butt)
88–f f–FIFA (world cup)
89–f b–FBI (Agent Smith from the Matrix)
90–b s–bus
91–b t–bat

92–b n–bean
93–b m–bum
94–b r–bear
95–b l–ball
96–b j–badge
97–b g–bag
98–b f–beef (steak)
99–b b–bobby (car)

To memorize larger numbers, you also need to be able to convert 00, 01, 02… into words.

Again, here is my table (Number–Consonant sounds–Word):

00–s s–Sissy (Austrian empress)
01–s t–seat (car seat)
02–s n–sun
03–s m–SIM (SIM card)
04 –s r–czar (Russian Czar Nikolas)
05–s l–seal
06–s sh–sushi
07–s k–sock
08–s f–sieve
09–s p–soap

How to memorize 4-digit numbers using the pre-memorized table?

To memorize 4-digit numbers, just convert each digit pair into an image using your pre-memorized words.

For example, to remember that the first moon landing was in 1969, convert 19->t b->tub and 69 sh p -> sheep. You could imagine a sheep in a bathtub landing on the moon. To retrieve the number, just remember the moon->sheep in a tub -> 1969.

When remembering years, you will seldom get confused as to which digit pair comes first, so you can usually just integrate them in an image. If there is a

chance that you might get confused, arrange the object representing the first digit pair to the left or on top of the object representing the second digit pair.

How to remember a complete date or a phone number?

A complete date consists of eight digits, so already a fairly large number. Many countries (but not the U.S.) note dates in the format dd-mm-yyyy. For example, the Berlin Wall fell on 9 November 1989. As a number, this is 09-11-1989.

Again, we want to memorize the date with our pre-memorized digit pairs:

09 is soap.

11 is tooth.

19 is tub.

89 is FBI.

Imagine a piece of soap hanging from the Berlin Wall (our anchor). A shark is biting its teeth into the soap. The shark is swimming in a bathtub. FBI agent Smith shows the shark his ID.

For dates of the 21st century, we normally only need to remember two digits for the *year*. That is, for a complete date we only need to remember six digits. In general, only memorize the parts of a number that you won't remember anyway.

Of course, you can also use the pre-memorized words and images to remember phone numbers.

In this case, choose a location you can associate with the number. For example, if you want to remember a friend's phone number, choose the entrance to his house or apartment, or any other outstanding feature/location as a cue you can use when you want to recall your friend's number. Then connect the images

representing the number's digit pairs to the location.

I have a Taiwanese friend who is a Chinese doctor. Since I usually call her on her mobile phone, I am going to connect her mobile phone number to a small armrest pillow on her desk. Her mobile number is +886 93956665 (please don't call that number – I changed it). I don't need to memorize 886, the code for Taiwan, since I know that one anyway:

93 is a bum.

95 is a ball.

66 is a judge.

65 is a shell.

I imagine a bum sitting in the patient's chair, resting his right arm on the small pillow on my friend's desk. He angrily throws a small ball at a judge sitting outside in the patient's waiting area. The judge defends himself by throwing back shells.

When I want to recall the number, I use the small pillow as a cue.

Who is sitting at my friend's desk?

The **b**u**m**, throwing a **b**a**l**l at a **j**u**dg**e. The judge throws back **sh**e**l**ls.

How to deal with single digits in a number?

When you convert an odd number into words and images (starting from the left), you end up with a single digit at the end. This is not really a problem since we also memorized words and images for the numbers from 0 to 9.

How to memorize a password or ATM code using the Phonetic Number System?

Now you are already an expert in memory techniques, so you can really take full advantage of your memory toolbox in a variety of ways to create passwords and memorize numbers. Many ATMs still use 4-digit codes. This is a bit short, but some banks will give you no choice.

To memorize an ATM code, you again need a cue that will remind you of it. Use your bank's ATM or another outstanding feature of your bank as location (cue), convert the number into two images, and link them with your cue.

For example, use your bank's ATM that you are most familiar with as cue, and find something special at that ATM to link your images to.

Let's say your ATM card's code is 5674. That is 56, a *leash*, and 74, a *car*. Imagine a leash tied to your bank's door handle. You have tied your car to the other side of the leash.

A very convenient way to memorize larger ATM codes (and also other passwords) is by inventing a phrase you can easily imagine (so you start with the phrase rather than the number) and creating your code from that phrase. This works, of course, only if you can change your code. In this case, I recommend that you use at least eight digits, or the maximum number of digits allowed by your ATM, if less than eight digits.

I just looked around and noticed my pencil case on my living room table:

My **p**e**nc**i**l c**a**s**e is made of **br**o**w**n **l**ea**th**e**r**.

Using only the nouns and adjectives, this phrase gives you an 12-digit number: 920570942514

As an alternative, you could also use only the first consonant sound (of each noun and adjective):

My **p**encil **c**ase is made of **b**rown **l**eather.

In this case, the phrase represents the 4-digit number 9795. I don't recommend 4-digit numbers, but many ATMs only allow 4 digits.

A method to create passwords containing letters and numbers was discussed in the section "Using Acrostics to Create Strong Passwords" (5.2). Essentially, you use a phrase or sentence and take each word's first letter as part of your password. I recommended that you use a sentence that also contains numbers.

Let's review this method. You randomly pick a sentence from a book or magazine, *etc.*

I picked:

The **p**hilosophies **a**nd **a**chievements **o**f **t**he **C**hinese **a**nd **G**reeks **2**500 **y**ears **a**go **w**ere **r**emarkably **d**ifferent.

Find and memorize *your* sentence, share it with no one, and don't write it down! If you don't feel comfortable with any particular sentence, create one by yourself.

Next, take the initials of each of the words and numbers, and create your password. In this case, we get a password with 15 characters: TpaaotCaG2yawrd.

As a variation to this method, you can now weave in the Phonetic System: Use a sentence or phrase, and use only the nouns and adjectives to represent numbers. All other words are used to form letters for your password. Let's revisit my pencil case:

My **pencil c**ase ***i***s ***m***ade ***o***f **br**ow**n l**ea**th**e**r.**

This phrase then results in the 16-digit password, M920570imo942514.

How to memorize very long numbers?

Memorizing really long numbers is part of the World Memory Championships and of many other memory performance shows. The current world record stands at 67890 digits.

How can a person memorize such a large number, and why would anyone want to do that?

Let's start with *why*: because they can.

It is a mental exercise that quite a few people enjoy. This is similar to asking: "Why would 22 people run after a ball and try to kick it into a goal?" Because it is fun and a good exercise.

Now as to *how*: You already have the tools. By combining the Method of Loci and the Phonetic Number System, you also can memorize a 100-digit number.

The mathematical constant Pi (**π)** is a wonderful number to train with. Pi is the circumference of a circle with diameter 1.

Pi starts with 3.14… Here are the first 100 digits of Pi after the decimal point, in blocks of 10 digits:

1415926535 8979323846 2643383279 5028841971 6939937510 5820974944 5923078164 0628620899 8628034825 3421170679.

Do you think you can memorize this number? I am confident you can. It is easier than you may think.

To accomplish this with the Phonetic System, you need your pre-memorized 2-digit words. You also need to create a journey with 50 locations, for example, a Memory Palace with 10 rooms and 5 locations in each room, or 5 rooms with 10 locations in each room.

Exercise: I want you to start slowly. Let's start with the first 20 digits, 14 15 92 65 35 89 79 32 38 46.

In the section on the Method of Loci (8.3), I used a hotel room with 10 locations. Since we are storing a digit pair in each location, we can memorize 20 digits using this room.

Chances are, you are in a room right now. Look around and memorize 10 locations in order. Start at the door, turn right, follow the circumference, and note 10 distinct locations.

Here is my hotel room again:

1. Armchair
2. Bamboo shelf
3. Bedside locker
4. Bed
5. Blue standing fan
6. Desk with printer on it
7. Small table
8. Dresser with mirror
9. TV table with TV
10. Wardrobe

Using your 10 locations, store the 10 digit pairs (i.e., 20 digits) in your room.

This is how I imagined it:

1. 14 is a *tire*: We have an armchair on wheels.
2. 15 is a *tail*: Cow tails are hanging from the bamboo shelf.
3. 92 is a *bean*: Green beans are sticking out from the bedside locker.
4. 65 is a *shell*: My bed's mattress is made out of white shells.
5. 35 is a *mill*: My blue standing fan looks like a windmill.

6. 89 is *FBI* Agent Smith: Agent Smith is searching through the papers on my desk.
7. 79 is a *cup*: My small table breaks under the weight of a huge coffee cup.
8. 32 is the *moon*: A half-moon-shaped lamp is hanging from my dresser, illuminating the room.
9. 38 is a *muff*: My TV is wearing a huge muff. He doesn't want to hear Jay Leno's (American comedian) jokes.
10. 46 is an *arch*: The handles of my wardrobe morphed into two blue-colored arches.

Do you have it?

Now go through the locations in order, recall the item stored in each location, and convert it into its corresponding digit pair.

My first location was the armchair: An armchair on wheels – *tire* – 14; then comes the bamboo shelf: cow tails hanging from the shelf – *tail* – 15, and so on.

How did you do?

It is not so difficult to memorize a large number, is it?

Memory champions often compete on speed, with the person who memorizes 100 digits the fastest winning.

To improve your speed and use fewer locations, you can place 4 or even 6 digits in a single image in one location. To accomplish this, you can combine the Phonetic System with the Dominic System we learn in the next chapter.

The Phonetic Number System as a filing system

Apart from converting numbers, you could also use the Phonetic Number System as a mental filing system with 100 pegs (locations); that is, you can use it essentially in the same way as the Number Rhyme or the Number Shape System. Each pre-memorized image from 0 to 99 serves as a storage location. This

allows you to store 100 items and recall them in order, or recall any item by its number. **Warning:** If you want to use the Phonetic System as a system for memorizing numbers, I would not use it as a filing system to avoid confusion.

9.2 The Dominic System

The Dominic System was invented by memory champion Dominic O'Brien and helped him to win the World Memory Championships a record eight times.[45]

Dominic O'Brien found that people and actions worked better for him when visualizing numbers than objects did. The Dominic System is similar to the Phonetic Number System in the sense that you can use it to convert numbers into images.

If your aim is to memorize numbers fast or to break records, it is more powerful than the Phonetic System as it allows you to easily memorize four digits in one image. You can also use it to memorize a deck of cards. It is, however, less versatile and takes a bit more effort to get started with than the Phonetic System since it relies on pre-memorized people and actions for digit pairs.

With the Phonetic System, you can start converting numbers into words and phrases without having to pre-memorize a list of words (although the list is certainly necessary if you want to be fast), and you can represent one number by different words or phrases. This makes it easy to use the Phonetic System to create strong passwords.

If you have serious needs for memorizing numbers, try both – the Phonetic and the Dominic System. Also, if you found the Phonetic System difficult to apply, try the Dominic System for memorizing numbers.

Learning the system takes a bit of practice, but by using the Internet it is a lot of fun, and you get to learn about famous people at the same time.

Famous people?

Yes, you are reading right. The Dominic System converts numbers into images of people doing an action typical for them. It is a personal system, created by you! Just to give you one example: When I see the number 84, I see Michael Schumacher, driving around a Formula 1 circuit in his Ferrari. (Well, he has retired, but that was when he was really successful.)

Let me show you how to get there:

First, we convert the numbers 0–9 into letters using the following table:

0–O
1–A
2–B
3–C
4–D
5–E
6–S
7–G
8–H
9–N

So 0 becomes O (ouh), 1 becomes A, 2 becomes B…

The number **s**ix starts with an S, so we choose S instead of F. Similarly, **n**ine starts with an N, so instead of I, we choose N. These two exceptions spice up the system. However, if you find it easier, you can also completely go with the normal order of the alphabet.

Make sure you perfectly remember the table above before going any further.

Next, we create letter pairs for the two-digit numbers 00 to 99 as below:

00–OO
01–OA
02–OB
03–OC
04–OD
05–OE
06–OS
07–OG
08–OH
09–ON
10–AO

11–AA
12–AB
….–….
90–NO
91–NA
92–NB
93–NC
…–…
99–NN

Now, look at each number and corresponding letter pair, and let it suggest a person to you.

Take the first person that comes to mind. For me 08 = OH, which is Oliver Hardy, 11 = AA – Andre Agassi, 32 = CB – Charles Barkley, 77 = GG – Lady Gaga…

For some letter pairs, you will intuitively come up with a person. Whether or not the person you are reminded of has the letter pair as initials, does not matter.

For me, 64 = SD, which is Dominic O'Brien (the memory champion). How did I come up with this? SD reminded me of an SD memory card, and memory reminded me of Dominic O'Brien. Consequently, SD became Dominic O'Brien. Similarly, 84 = HD, which reminded me of a hard drive, which reminded me of Michael Schumacher driving around a Formula 1 circuit, so HD became Michael Schumacher.

This way, you will automatically get people associations for many of the letter pairs. Sometimes, a number might even directly suggest a person to you.

For example, 07 could remind you of James Bond and 49 of Joe Montana (former quarterback of the San Francisco 49ers).

What if a two-digit number and/or letter pair does not remind you of anyone? Then take the letter pair as initials, and try to find a famous person, relative, friend, *etc.* who has these initials.

The final step in building *your* Dominic System is to find one typical action and an object related to this action for each person.

For example, Andre Agassi is normally playing tennis (action), so a tennis racket would be a related object. Joe Montana is throwing a football (action), so an American football would be his object.

Don't expect to come up with 100 people, actions, and objects at one time.

A good strategy is to try to come up with and memorize 10 people a day. Take the person that first comes to mind, and think of an action typical for him/her and a related object. If you cannot find an action and object for a person, try to find a different person for the particular letter pair. Also, make sure that the actions and objects are different for each person. You should have only one tennis player, only one person shooting a pistol, only one conductor, only one guitar player, *etc.*

It is important that you have an image of each person performing his action and the related object in your mind.

Important Note: *You might eventually be using both the Dominic System and the Phonetic System. For this reason, avoid reusing the items you used to pre-memorize the numbers from 0 to 99 and 00 to 09 in the Phonetic System, or if you are learning the Dominic System first, avoid reusing the pre-memorized Dominic persons, actions, and objects in the Phonetic System. This way you won't get confused as to which number an item represents.*

Practice by taking a number, converting it into its letter pair, and visualizing the person performing his/her action using the related object. If you want to see pictures or videos of the person, Google Images and YouTube are wonderful resources.

To help you to keep track, create your own table similar to mine:

#		Person	Action	Object
00	OO			
01	0A	My Mother	Private	
02	OB			
03	OC	Oliver Cromwell	Stealing the king's crown	Crown
04	0D	Ludwig van Beethoven	Conducting	Conductor's baton
05	OE	Private		
06	OS	Private		
07	OG	James Bond	Shooting	Pistol with silencer
08	OH	Private		
O9	ON	Private		
10	AO	Private		
11	AA	Andre Agassi	Playing tennis	Tennis racket
12	AB	Abraham Lincoln	Freeing a slave from ball and chain	Ball and chain
13	AC	Bon Scott (former lead singer of AC/DC)	Igniting TNT	A dynamite stick
14	AD	Private		
15	AE	Albert Einstein	Writing $E=MC^2$ on a black board	Piece of chalk and black board
16	AS	Arnold Schwarzenegger	Lifting weights	Dumbbell
17	AG	Private		
18	AH	Private		
19	AN	Alfred Nobel	Awarding the Nobel Price	Nobel Price Medal
...				
49	DN	Joe Montana	Throwing a football	American football
...				
81	HA	Hans Albers	Playing the accordion	Accordion
99	NN	Nick Nolte		

The names and actions given in this table excerpt are just examples to show the

principle. You need to come up with your own personal associations to make the system work for you.

For some letter pairs/initials, you might need help to come up with a person. A perfect resource to find people is the Internet.

There are several websites on the Internet with lists and biographies of famous people. *(Please check remembereverything.org/book-resources for website suggestions.)*

It is important that you make yourself at least somewhat familiar with the person (+ action + object) and have a clear image of her/him in your mind. To this end, read an article on Wikipedia about the person, try to find photos on Google Images, or watch the person on YouTube.

A good way to train is by way of a flash card program. On the front side of the flash card, write the number; on the backside goes the name and action of the person. If you are not yet familiar with how the person looks, you can download an image and insert the person's image on the backside.

Memorizing numbers using the Dominic System

To memorize a number, we convert the number's digit pairs into images of people and actions and combine them into one image or animated scene using the following rules:

1. The first two digits of a number always represent a person.
2. The next two digits represent the action of the person whom the digit pair stands for.
3. For further digit pairs, again follow steps 1 and 2.
4. If the number is an odd one, you are left with a single digit. Use the corresponding number shape from the Number Shape System to visualize that last digit.

Examples:

Let's say, you want to memorize your 4-digit ATM password, 1504.

15 is Albert Einstein, and 04 is Beethoven (see my table above).

Imagine Albert Einstein conducting (Beethoven's action) in front of your Bank.

What if your ATM code has 5 digits, for example, 15044?

This is an odd number, so the last digit is represented by a number shape: Albert Einstein is on a sailing boat (the sailing boat is the number shape for *4*) conducting in front of your bank.

Let's use a 6-digit number, for example, 991216:

99 is Nick Nolte, 12 is Abraham Lincoln, and 16 is Arnold Schwarzenegger.

Now, Nick Nolte (99) is in front of your bank, freeing (12) Arnold Schwarzenegger (16) from ball and chain.

Note: According to my table, Abraham Lincoln's (12) action is freeing someone from ball and chain.

Finally, an 8-digit number 99121607:

Nick Nolte (99) is in front of your bank, freeing (12) Arnold Schwarzenegger (16) from ball and chain who is shooting a pistol with a silencer (07) at the bank's main entrance.

Note: James Bond's (07) action is shooting his pistol with silencer.

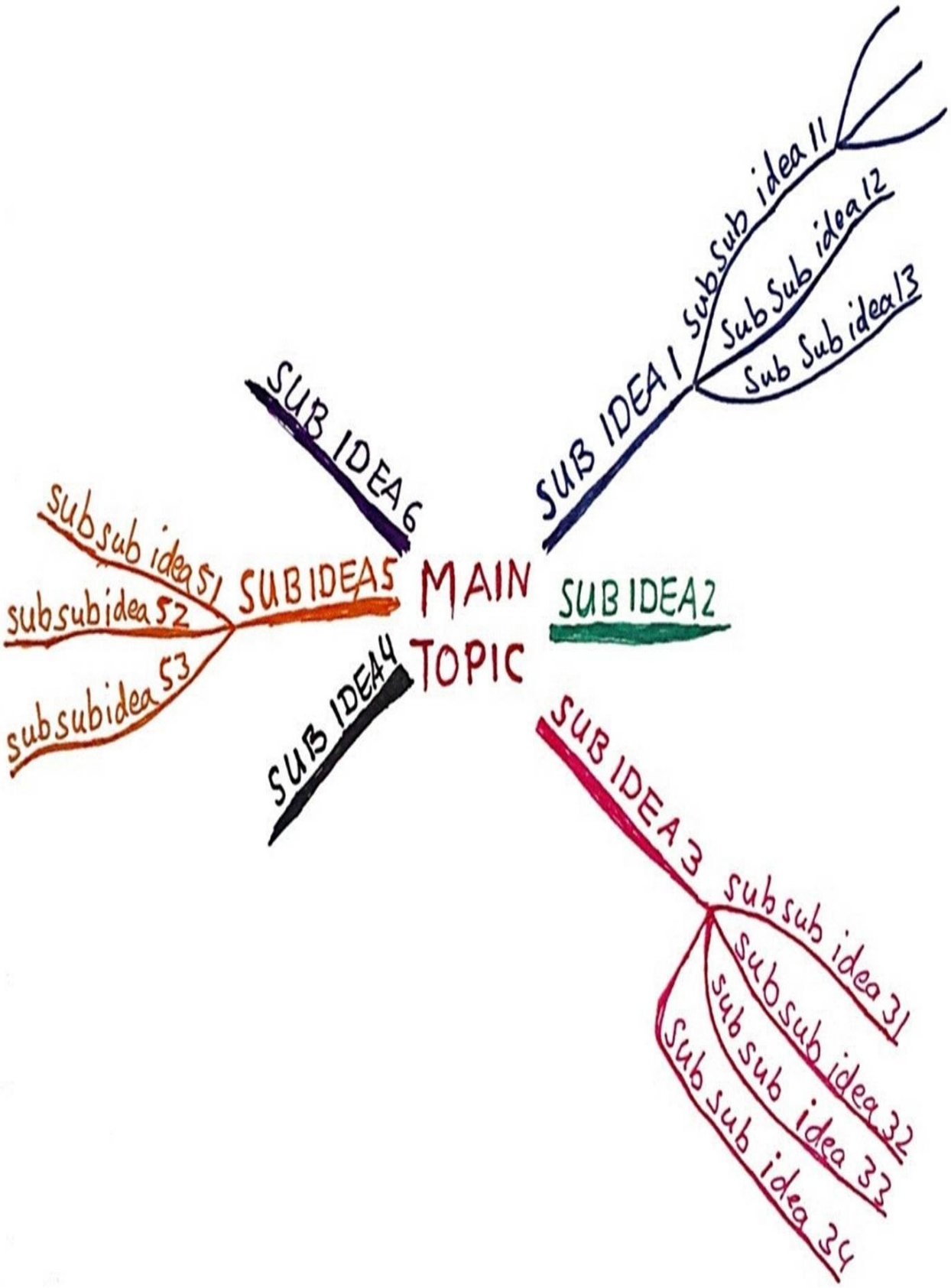
Remembering really long numbers

As with the Phonetic Number System, to remember a really long number, you combine the Dominic System with the Method of Loci. By storing a person plus an action at a location, you can memorize up to four digits at each location. If

you want to go even further, you can combine the Dominic System with the Phonetic System and store up to six digits in one location. By always using the order person, action, object (the object from the Phonetic System), we can keep the digit order and avoid confusion.

10 Mind Mapping

Mind mapping is a graphical method for thinking, taking notes, and organizing and linking information. As we already know, grouping, categorizing, visualizing, and linking are extremely helpful when memorizing and recalling information. Mind mapping can be done by hand or by using a computer program.


MAIN TOPIC
SUB IDEA 1
Sub Sub idea 11
Sub Sub idea 12
Sub Sub idea 13
SUB IDEA 2
SUB IDEA 3
sub sub idea 31
sub sub idea 32
sub sub idea 33
sub sub idea 34
SUB IDEA 4
SUB IDEA 5
sub sub idea 51
sub sub idea 52
sub sub idea 53
SUB IDEA 6

Mind maps (the result of mind mapping), are similar to concept maps, spider diagrams, and tree diagrams. British author Tony Buzan, according to his own account, devised the modern technique of mind mapping. He certainly did a lot of work to promote its use and refine the technique. In his book *The Mind Map Book*, he describes a specific set of guidelines on how to create mind maps.[46]

Why should you learn mind mapping?

Mind mapping helps us to note down important information in a structured and condensed way, so that we can easily memorize, recall, and review it. This is very helpful when memorizing larger amounts of information, such as chapters of books, complete books, lectures, or speeches. Besides, it really is great fun.

For example, you can distill the information from a 30-page book chapter and create a single-page colorful *mind map*, summarizing the important information in the form of keywords, connections, small drawings, and colors.

Because you are subsequently only looking at a single page, memorizing and recalling the chapter become a breeze. Reviewing information this way is also much easier and less time-consuming since you only need to look at one mind map, instead of going through a 30-page chapter containing underlined passages and annotations.

Where else can you use mind mapping?

Mind mapping is widely used to brainstorm new ideas, plan anything from a single day or holiday to a complex project, do research, and so on.

What is a Mind Map?

A mind map is a diagram with the main topic/idea in the center of a sheet of paper. The main idea could be the title of a book or a book chapter, a question for which you are seeking an answer, the topic of your speech, *etc.*

Sub-ideas are written on thick branches radiating from the center. Each sub-idea

can again have sub-sub-ideas, which are connected to the sub-idea with branches.

10.1 How to Do Mind Mapping?

Prepare at least six different colored pens and a white sheet of A4 or A3 paper. I recommend using gel or pigment ink pens.

1. Use your paper in landscape orientation.
2. Write a keyword for your main topic/idea/question in capital letters in the center of the page. Also, create a picture that represents your main topic. Use colors and symbols to make the mind map interesting, vivid, and colorful.
   Note: If you can't draw well, you are not alone. Neither can I. Creating works of art is not what we are looking for when creating a mind map. The drawings are there to spur your memory.
3. For each main sub-idea, draw a thick branch originating from the center, and write a capitalized keyword representing the sub-idea on the branch.
   Tips:
   - *The branch length should be about equal to the length of the keyword.*
   - *Use a different color for each main sub-idea.*
   - *If you can, again create a small drawing for the sub-ideas.*
4. To note down a sub-sub-idea for a sub-idea, draw a branch from the sub-idea (make it a bit thinner), and write a keyword on the branch.

Some rules:

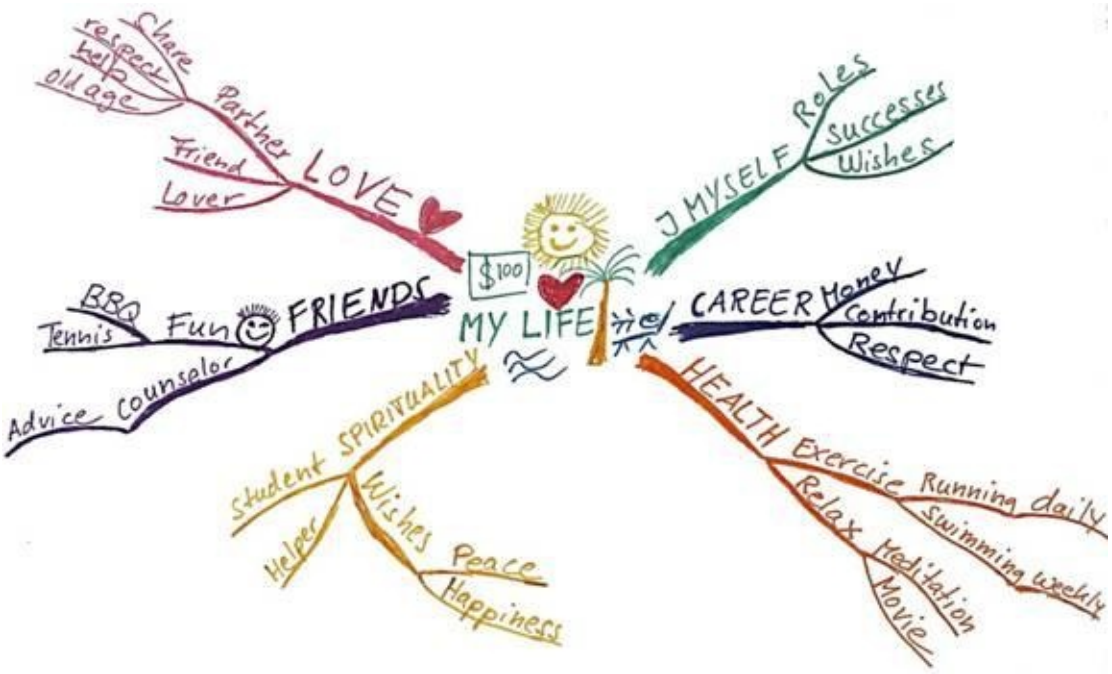
1. Use only one or two keywords on each main branch (noun, verb, or adjective – try to avoid long phrases and sentences for main branches).
   - This forces you to distill the important information and makes it easier to memorize the map and attach sub-ideas.
   - Sometimes, I break this rule for sub-branches.
2. Use CAPITAL LETTERS for the main topic/idea and on the main branches.
3. Use a different color for each main branch. Sub-branches usually inherit a main branch's color. This makes it very easy to see what belongs together.
4. Use symbols to emphasize, question, and express feelings, and instead of key words.
5. Vary the size of your writing and the thickness of your branches.
6. Develop your own style.

Basic ordering idea (BOI):

The main sub-ideas (the ones linked directly to the main topic/idea) are also called *basic ordering ideas*.

Exercise: For your first mind map, I suggest you create a mind map about yourself. Ask yourself, “What areas are important in my life?”

You can use the example mind map “MY LIFE” as guidance:



10.2 Mind-Mapping Applications

Mind mapping is a versatile technique and used in a variety of different areas:

- Coming up with new ideas for a challenge or problem (e.g., by brainstorming alone or in a group)
- Creating and memorizing a summary for a book chapter or a complete book
- Preparing and memorizing a speech or a lecture you are giving
- Planning:
  - Your day
  - A class
  - Your life
  - Tasks
  - Meetings
  - Projects
  - A holiday
- Taking notes of a meeting or a lecture you are attending
- Organizing information and research
- Writing a book

10.3 What about Computers and Mind Mapping?

For most tasks, including summarizing and memorizing a book or a book chapter, both hand-drawn and computer-created mind maps have their fans.

Hand-drawn maps tend to be unique and hence easier to remember. Computer-created mind maps, on the other hand, can more easily be reorganized, allow you to focus on the information and leave the drawing to the software, and can handle more information (your page size is virtually unlimited).

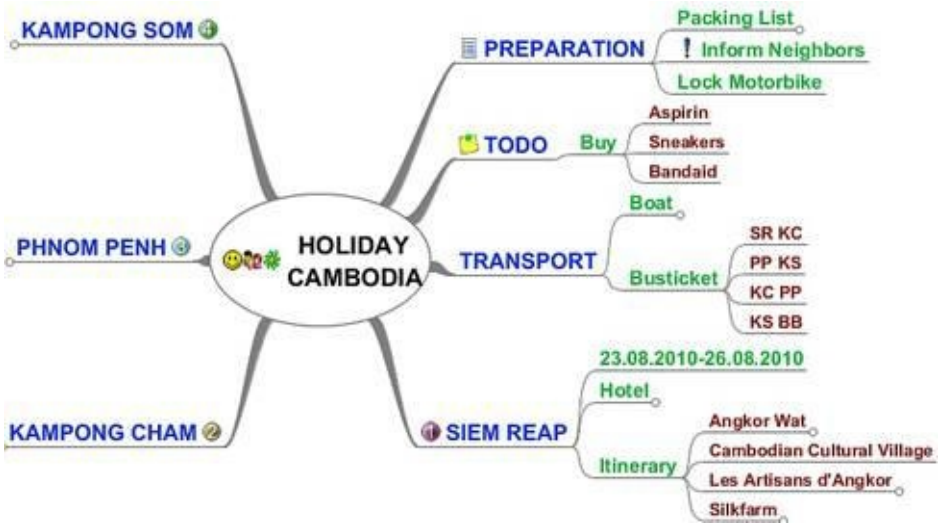
I suggest you start with hand-drawn mind maps to get a feeling for the technique, and then move into computer mind mapping to broaden your experience.

For planning, brainstorming, information gathering, and research, mind mapping software can be particularly helpful, because you can easily move branches around and create the mind map as large as you like.

I use a free program called Freeplane (freeplane.sourceforge.net), which is a user-friendly offspring of the popular software Freemind.

I created the following mind map with Freeplane to plan a holiday in Cambodia.

Note: some of the sub-branches are folded, so you only see a part of the mind map:



Some websites (e.g., bubbl.us) allow you to create and share mind maps online.

If you want to use mind mapping in your place of work, for example, to manage complex projects, also consider commercial software, such as Novamind and Mindjet's Mind Manager. Both should have a trial version available.

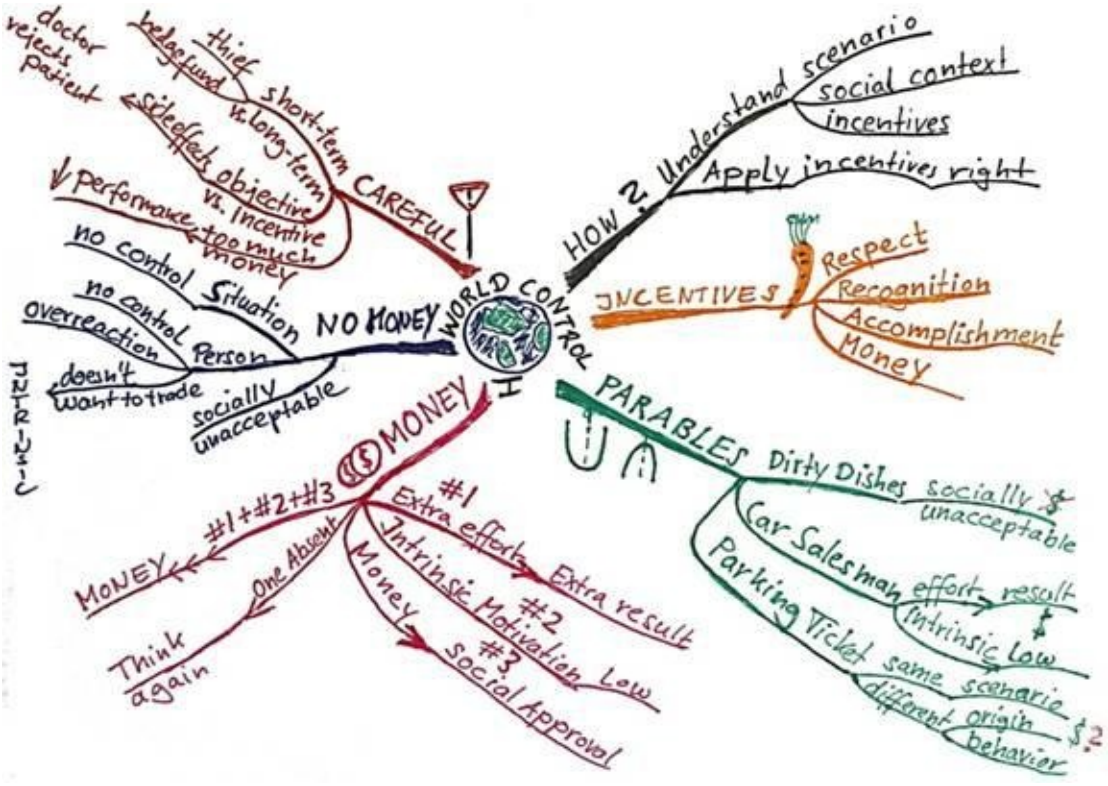
10.4 How to Memorize a Complete Mind Map?

The mind map's hierarchical structure orders and categorizes information. This makes it easy to recall most, if not all, of it.

However, sometimes you may want to memorize another person's mind map or a very complex mind map. Maybe some parts of the mind map just won't stick.

Now we can dig into our toolbox and use visualization, the Link System, the Method of Loci, or another kind of peg list to either selectively or completely memorize the mind map.

Consider the following mind map, which I created to summarize the book chapter "How to Control the World, The Basics" (*Discover Your Inner Economist* by Tyler Cowen):



The central image is a globe and the key word is World Control I.

We are going to memorize the six basic ordering ideas (HOW, INCENTIVES, PARABLES, MONEY, NO MONEY, and CAREFUL) in a clockwise order.

For this mind map, I have decided to memorize WORLD CONTROL and the six basic ordering ideas in one image:

For *WORLD CONTROL*, I imagine a Mr. *Globe*. (He looks just like my central image and has arms and legs attached.) Mr. *Globe* is connected (via a cable) to a joystick (*CONTROL*).

Mr. Globe is forming a speech bubble containing a question mark (*HOW?*). He has a carrot (*INCENTIVES*) in his mouth (imagine the globe having a Pacman-style mouth) and is balancing on an arch (*PARABLES* look like arches). Mr. Globe has a bunch of quarters (*MONEY*) in his left hand and an empty wallet (*NO MONEY*) in his right hand. Mr. Globe is bouncing down the arch towards a yield sign (*CAREFUL*) at a large intersection.

To remember the sub-branches for a main branch, create an image for each of the sub-branches, and link each image to the corresponding main branch's image (either in one composite image or in a series of linked images). In general, I only do this selectively for the branches in which I have trouble remembering the sub-branches.

Suppose, you are doing fine remembering the sub-branches for the first five branches of the mind map.

However, for some reason the sub-branches for CAREFUL – our yield sign – don't want to stick.

Visualize the intersection where our yield sign is put up:

A stopwatch is fighting against a calendar at the yield sign (*short-term* vs. *long-term*). A target with a carrot stuck right in the bull's eye (*objective* vs. *incentive*) is hanging from the yield sign.

A man, half buried under a heap of coins, is lying half-dead at the intersection (*too much money*), just behind the fighting stopwatch.

This is basically all there is to memorizing a mind map using mnemonics.

Additional tips for memorizing a mind map:

- *In many instances, your central image itself can serve as a cue for an image containing the basic ordering ideas. In the mind map above, the central image is Mr. Globe, controlled by a joystick.*
- *As an alternative, you could use the seven continents on the globe and connect each basic ordering idea to one continent. You could start in North America and proceed in a north to south and west to east fashion. Take a landmark or other feature that comes to mind for each continent. Voila, you have a journey with seven locations.*
- *You can also specifically create a central image with several distinct features to serve as hooks for your mind map's basic ordering ideas. Consider the above mind map. You could, for example, use a control room to represent it. The items in the control room can then serve as pegs.*
- *Finally, if you have a very large mind map, you can create a complete Memory Palace. Each of the palace's rooms represents one of the basic ordering ideas. Furnish each room with enough items to have pegs for all sub-ideas.*

Does this really work?

Mary and Joel Levin researched whether so-called mnemonomies can be effectively used to memorize hierarchical classification systems.

They had undergraduate students memorize a plant-classification hierarchy using visualizations. This is very similar to what we did when memorizing the mind map "WORLD CONTROL." Note that a mind map is essentially a hierarchical diagram with the central idea as its root.

The students who used visualizations significantly outperformed a control group on both hierarchy construction and problem solving.[47] What's more, the students enjoyed this method and were more confident in their knowledge. Experiments by Carney and Levin with a fish-classification hierarchy (2003) confirmed and expanded on these results.[48]

10.5 Advantages of Mind Mapping and Alternatives

- Mind mapping uses the power of pictures and colors and is two-dimensional.
- Mind maps make it easy to memorize, recall, and review important information.
- Using mostly keywords forces you to focus on what is important and helps greatly to reduce the information you have to memorize and review.
- You can easily organize thoughts in a mind map.
- It is easy to get an overview.
- It is easy to make connections (= to associate) between ideas. (Just draw a line with arrow-shaped endpoints between two ideas on different branches.)
- Mind mapping is fun.
- You can always add something to your mind map.
- Planning tasks and reorganizing mind maps become a breeze if you use a computer mind mapping program.

Alternatives to Mind Mapping

A powerful alternative technique to mind mapping is outlining. Outlining is particularly effective when done on a computer because you can quickly reorganize information and hide details. When I read and summarize very dense books or want to include verbatim information (e.g., quotes), I often create outlines. Check the section “Note taking and Outlining with OneNote” (16.1) for more information. My suggestion is: do not limit yourself to one technique, but rather use both mind mapping and outlining.

11 How to Read and Memorize a Non-fiction Book?

Motivation

If I give you a book and personally vouch that you will become rich, find the love of your life, or regain health in one month by following the ideas in that book, you will have no problems whatsoever to remember the important information, provided you believe me.

Why is that?

You have a clear goal, and this goal motivates you to understand and remember the information that matters for your goal.

You will also explore any relevant but unclear issue and try to find answers.

This is what you need to start with: **Motivation**. You need to feel interested in the book; you need to want to explore it.

It helps, of course, if the book is one of your own choosing.

While at school, university, or work, we cannot always choose what we read, but we can always try to get something interesting out of a book.

To motivate yourself, ask questions that interest you before you start reading:

1. Why do I read this book?
2. What do I want to get from this book?
3. How can this book help me (to achieve my goals)?
4. …

You will notice that it helps your attention tremendously to have questions for the book before reading it. Provided the questions are interesting enough (or will help you to pass an exam), you will constantly try to answer them while reading the book, and even after you have put it away. You are on a mission.

You will be reading actively and not just staring at the pages with your mind imagining that roasted pork knuckle you hope to eat for lunch.

My reading toolbox

To make our reading and memorization efficient and enjoyable, we are going to use a set of tools:

1. Questions
2. The reading method SQ3R to find interesting questions and read in a systematic way
3. Mind mapping to summarize each chapter (After creating a mind map, chances are, you can already remember all the important points.)
4. Visualization, the Link System, the Method of Loci (journeys, memory palaces), and other mnemonic tools to memorize the mind map

11.1 The Reading Method SQ3R

SQ3R is an acronym for a 5-step reading method originally suggested in 1946 by Francis Pleasant Robinson in his book *Effective Study*.[49] Multiple modifications, further detailing the steps, have been suggested, including PQRST, SQ4R, *etc.*

All of these methods are quite similar, provide a systematic approach to reading, and suggest that you formulate questions first **and then read actively with the aim of answering these questions**. Note that all the acronyms contain a *Q*.

SQ3R stands for:

1. **S**urvey (the book/a chapter, getting an overview).
2. **Q**uestion (ask one or more questions for each section in a chapter).
3. **R**ead (and mentally answer the questions).
4. **R**ecite (recall the answers to a section's questions from your memory, and write them down).
5. **R**eview (a complete chapter, by answering the chapter's questions from your memory).

Francis P. Robinson was a professor of psychology at Ohio State University during World War II. He originally devised SQ3R to help military personnel who were sent to colleges and universities to learn specialized skills in as little time as possible. Robinson designed SQ3R to read a textbook in a systematic way and thus remember the important information.

He assumed a textbook with chapters containing headed sections. Robinson suggested turning each section heading into a question (step 2), and then actively reading the section (step 3) to answer the question. After each section, the student is to recite the answer to the question from memory and note down this answer as a phrase or keywords on a sheet of paper (step 4) (in his own words and, preferably, in outline form). Steps 2 to 4 are to be repeated for each headed section of a given chapter. Step 5 – review – is performed after completing a chapter by briefly looking over the notes to get the big picture and then reciting

the chapter’s main points from memory.

Depending on the book and your reading purpose, you might want to adapt the approach.

For example, if you have short chapters or chapters with no headed sections, you can formulate all questions for a particular chapter in advance and then actively read the chapter in one go before reciting the answers. This, in fact, is my favorite way of applying SQ3R.

11.2 Modified SQ3R Incorporating Our Reading Toolbox

In the following, I will guide you to use the five basic steps of SQ3R and weave other elements into the process to make memorizing easier and reading fun. I want you to go on a quest when reading!

I suggest that you experiment and adapt the approach depending on the kind of book you read and the reason why you read that book.

For example, if you read a book completely out of your own interest, note down and follow the questions you find most interesting, and read the book to that end. On the other hand, if you read a book or book chapter to pass an exam, in addition to your own questions, find out what kind of questions are likely to be asked on the exam.

Prepare five sheets of A4/Letter paper:

- For the whole book: *Sheet Motivation and Questions to the Book*
- For each chapter **QASM**:
    1. ***Q****uestionsheet:* Here you write down all the questions you have for the particular chapter.
    2. ***A****nswersheet:* On this sheet, answer the questions for the chapter after having completed it (or go by sections if the chapter is large).
    3. *Sheet* ***S****parks:* Here go all your notes, associations, and everything else you want to note down while reading.
    4. *Chapter* ***M****ind Map, A4/A3 landscape:* During your first review, condense what you have read into a mind map.

11.2.1 Survey

Motivation

Ask yourself:

- Why am I reading this book?
- What do I want to get from this book?
- How can this book help me (to achieve my goals)?

Write the answers on your sheet *Motivation and Questions to the Book.*

Survey the book (once for a book)

Title, Author, and Publishing Date

Write the title, author, and publication year on the same sheet.

It is important to know how old a book is. In some areas, a book from 1946 or even a book written during the Roman Empire is a jewel (e.g., a book on memory techniques). On the other hand, you would want a book as current as possible when reading about the Internet.

For the whole book, read the preface, introduction, and table of contents. Also briefly read chapter summaries. At this point, you may already have questions, which you again note on the sheet *Motivation and Questions to the Book.*

Survey the chapter you are going to read

After having previewed the book, start skimming the first chapter. Read the chapter's heading, section headings, bullet points, numbered lists, tables, graphics, and charts. Also skim through the chapter summary, if there is one.

Whenever an interesting question pops up in your mind, write it on the chapter's ***Q****uestionsheet*.

What can you do if the chapter and section headings don't mean anything to you or there aren't any headings?

In this case, briefly read the first and the last page of the chapter. Many books tend to have the most important info on the first and last page of a chapter. Don't

worry if you don't understand everything. It will help you to come up with questions, and that is all that counts at this point.

11.2.2 Question – Ask Questions for the Chapter

Having skimmed the chapter, you probably already have a list of questions on the chapter's ***Q****uestionsheet*.

Reflect on what you have just taken in, and note down all additional questions you have for the chapter.

Tip for reading textbooks: As suggested by Robinson, turn chapter and section headings into questions. Choose one or more of the question words – what, who, where, when, why, how – and make a question.

After having finished your question list for the chapter, choose the questions that most interest you (or are most important for your exam) and number them in the order of importance. If you are reading out of interest only (as opposed to reading for an exam), focusing on five or so questions will normally be enough to keep you interested and get the important information out of the chapter.

11.2.3 Read – the Whole Chapter

Read the chapter at your own pace, and mentally answer the numbered questions. If you have an idea or a point that needs to be clarified, or anything else you want to note down, write it on the sheet ***S****parks*. ***S****parks* is your scratch pad.

After you have finished a section, or in the absence of sections one or two pages, go through the chapter's ***Q****uestionsheet* and mentally answer the questions, in particular the ones for the section you have just completed.

Should you underline/highlight while reading?

If you want to underline, I suggest that you do it after you have finished a section – not while reading. In many instances, you only know after finishing a section what is important.

So you have finished your first chapter?

You have noted your ideas, associations, points you want to clarify, *etc*. on your sheet ***S**parks* and have mentally answered the numbered questions on your chapter's ***Q**uestionsheet*.

Now we proceed to the next step, reciting.

11.2.4 Recite

Reciting is a way of testing how much you know and further consolidating the information in your memory. You recite by recalling the answers to your questions from memory.

To do this, take your chapter's ***Q**uestionsheet* and proceed through the numbered questions.

Use a separate ***A**nswersheet*, and answer each of the numbered questions (using only short phrases) in your own words. I recommend that you really write down the answers.

After answering the questions, go through the chapter's sections and check if you remembered most of it. Do this for all numbered questions on your ***Q**uestionsheet.*

Also briefly fly over your sheet ***S**parks*, and check if there are still points you need to clarify.

Depending on the type of book you are reading, there may also be exercises and review questions. Choose the important ones and do them as well.

After having finished the recitation, you most likely have a solid understanding and memory of the important parts of the chapter. You also have answered your numbered questions in writing. Take a break at this point, and give the information some time to settle down. “You have stirred up a lot of sand in the ocean; now you need to give it time to sink to the bottom.”

11.2.5 Review

How long should you wait before proceeding?

Generally, you should review a chapter after reading it. However, you already did your first review by doing the step *Recite*. You recalled the answers to the questions and wrote them down. You also compared your answers with the book to get a feedback.

Depending on how much time you have, do your review a few hours later.

Our goal for this review is to retest your recall for the answers to the questions on your ***Q****uestionsheet* and to produce condensed notes for the whole chapter in the form of a *Chapter **M**ind Map*.

First, go through the chapter’s ***Q****uestionsheet* and again mentally answer the questions from your memory. Compare your recall with your written answers on your ***A****nswersheet.*

After having completed the recall, create a *Chapter Mind Map*.

Put the chapter name and an image in the center of your mind map. Reflect on your questions and the answers. What is most important? What keywords can you distill from the answers to the questions to serve as main branches (= basic

ordering ideas) of the mind map? Try to use only one keyword per main branch. You should aim for five to six main branches at most, as basic ordering ideas. Try to create an image for a keyword where you can.

Don't worry; you don't have to be an artist to do this; the images don't have to be beautiful. They just serve to remind you of the keywords/concepts. For each of the main branches, create sub-branches by distilling the rest of the important information from your chapter's ***A****nswersheet*.

Note: *Bear in mind that we are creating this mind map for further reviews. The structure is there to help us to memorize it in a way that allows us to recall the important information. Therefore, the mind map doesn't have to hold all the information, not even all information from the answers. It just needs a structure (to create hooks) and enough information to enable us to recall the important information and answer the questions again, while mentally going through the branches and sub-branches.*

Should you use a chapter's section headings as basic ordering ideas (BOIs)?

Using the section headings as your BOIs is perfectly fine. Alternatively, you can also create your own structure. Most important is that the structure makes sense to you. There is no single perfect way to organize information, so experiment. For some books, the chapters' section headings work fine, while in other books you may not have section headings, or may want to use your own structure to spur your memory.

Having created your *Chapter* ***M****ind Map*, go through it in a clockwise order and try to recall the main branches. Next, for each of the main branches, try to recall the sub-branches.

You will probably be able to recall the mind map. If you are satisfied with your recall, you don't need to use any further memorization strategies.

If it is a complex mind map and/or you need an extra memory booster – help is at hand. We can use visualization, the Link System (5.3), and the Method of Loci (8.3) to memorize the parts of the mind map that don't stick. (See the chapter

"Mind Mapping" (10) for details on how to memorize a mind map.)

11.2.6 Subsequent Spaced Reviews

As with any information you want to keep accessible in your long-term memory, you do need to review the *Chapter **M**ind Map* again from time to time.

How often should you review?

As a general guideline, I suggest to review after 1 day, 2 days, 1 week, 2 weeks, 1 month, 3 months, 6 months, and 1 year. Please see the chapter on spaced reviews (6) for more details.

Each review only needs a few minutes: You mentally traverse through the mind map and try to reconstruct it mentally. Then answer the questions again.

For each subsequent review, again mentally travel through the mind map in a clockwise fashion. Try to recall the main branches. Then for each main branch, recall the sub-branches…

After having recalled all the information, compare your recall with your mind map to check whether you have missed anything.

Also go through your question list and answer the questions again.

If you need the information for an exam, make a plan that allows you to review all chapter mind maps before the exam.

Tip: As an alternative to mind mapping, outlining (and in particular outlining with a computer), as described in a later chapter, is another wonderful method to summarize and memorize a book's important information. I suggest that you experiment with both.

12 Reading and Knowledge Management in the Digital Age

This brief chapter sets the stage for the following three chapters: how to collect, organize, read, and annotate digital information and make it your own.

When I was a student, most of the material I consumed to learn, further my knowledge, and research was made of paper. The copier was my best friend.

Universities and communities created enormous libraries organizing and storing books, encyclopedias, journals, and magazines. Later multimedia sections were added, and we could consume movies and documentaries from the library's VCR and DVD collections.

In the early 1990s, this changed dramatically with the invention of the World Wide Web and the introduction of Mosaic. Mosaic was a neat program that could display documents (now widely known as web pages) containing text and graphics and allowed people to click on certain text areas or images (called hyperlinks or links) to navigate to other web pages. Mosaic was the first web browser, and it was free.

The Internet has come to almost every household in the industrialized world, and the developing world is catching up fast. While many people, including myself, still love to hold a "real book" made of paper – and I believe the printed book is not going to die any time soon – times are definitely changing: on May 19, 2011, Amazon.com, the world's largest online retailer, reported that Kindle e-book sales had surpassed their printed book sales – hardcover and paperback combined.[50]

What does this mean for us as active information users?

First of all, the amount of information accessible to us is incredible. This is great because we have choice. For many niche subjects it was traditionally very difficult to find information. Nowadays, the information on a special kind of butterfly, fern, or manga might be only as far away as a Google Search on your

Smartphone.

But we are also becoming flooded with information; we are gathering information from many different sources and in many different formats, and most of the information is paperless and likely delivered to us via the Internet. While still useful, the traditional tools like files, cabinets, copy machines, paper notebooks, and paper index cards aren't going to allow us to efficiently collect, organize, read, summarize, review, and manage the information we gather from the Internet.

The main objective of the following three chapters is thus to give you the tools and ideas to efficiently deal with information you are likely to encounter on the Internet, and to make it your own.

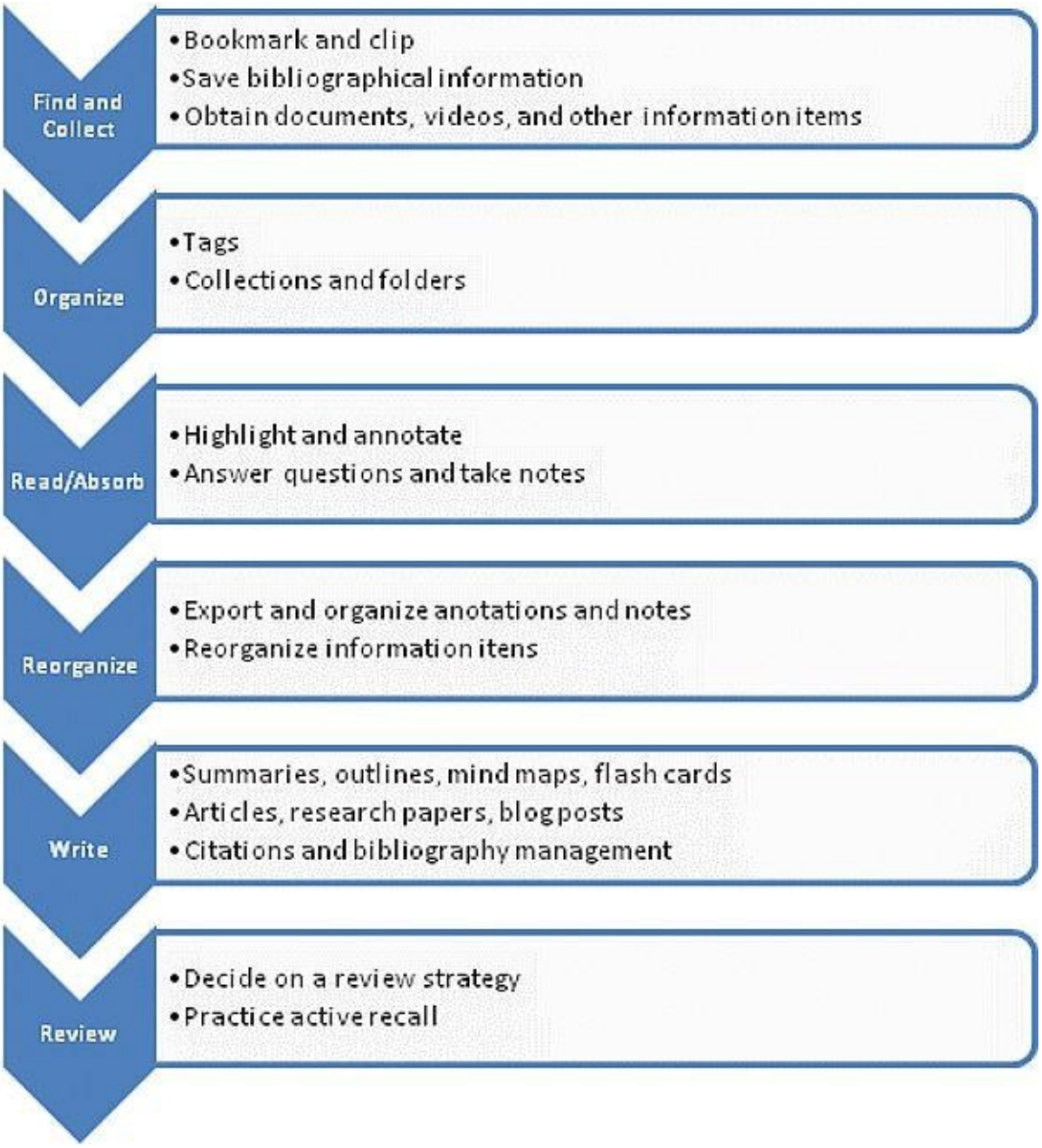
Human 2013 typically consumes traditional sources, such as printed books, articles, lecture notes, TV, radio, etc., **and a multitude of different Internet sources**:

1. **Web pages including:**
    - Standard web pages
    - Forum discussions
    - Blog posts
2. **E-Books and E-articles:**
    - PDF documents and books
    - Kindle and Nook books
3. **Videos and Podcasts**
4. **Other electronic documents:**
    - Spreadsheets
    - Word processor documents
    - Images
    - Presentations
    - Slideshows
    - Emails
    - Instant messages, including Twitter feeds…

Overview reading and knowledge management workflow

In the following, the term *information items* refers to all kinds and formats of information a person typically absorbs, including books and other text documents, videos, podcasts, web pages, multimedia presentations, and so on. By the same token, the word *reading* can also be substituted by watching, listening, *etc.*

A modern, generalized workflow for absorbing information and managing knowledge tends to look somewhat like this:


Find and Collect
• Bookmark and clip
• Save bibliographical information
• Obtain documents, videos, and other information items
Organize
• Tags
• Collections and folders
Read/Absorb
• Highlight and annotate
• Answer questions and take notes
Reorganize
• Export and organize anotations and notes
• Reorganize information itens
Write
• Summaries, outlines, mind maps, flash cards
• Articles, research papers, blog posts
• Citations and bibliography management
Review
• Decide on a review strategy
• Practice active recall

People collect and devour information for many different reasons.

Use cases include:

1. Casual use of information: You are reading an article or watching a video out of interest or because you stumbled across it by chance and found it attractive. Maybe someone told you such and such, and now you just want to read a bit more about it on Wikipedia.
2. Reading a complete book or watching a presentation on a topic of interest or a topic assigned as coursework.
3. Reading texts or absorbing other information items (videos, podcasts, etc.) to learn more about or even become an expert in a specific topic.
4. Reading texts or absorbing other information items in order to write a research paper, a blog post, or even a book.

Depending on which use case applies to you, you will only need part of the general reading and knowledge management workflow.

The workflow is designed to cover all four use cases outlined above, so by all means, select the parts and tools you need.

Consider Case 3:

To really learn everything there is to know about a topic, you need to process a variety of sources. You might start with a general book, article, or video on the topic, and then move on to find and collect a variety of further information items. This could include books, book chapters, articles, research papers, videos, time-lines, images of artifacts, *etc*. As output, you want to produce summaries, mind maps, and outlines, which allow you to easily memorize and review what you have learned.

From a reading perspective, Case 4 is not much different. You still need to follow the same steps, but your final outputs are not summaries, but polished

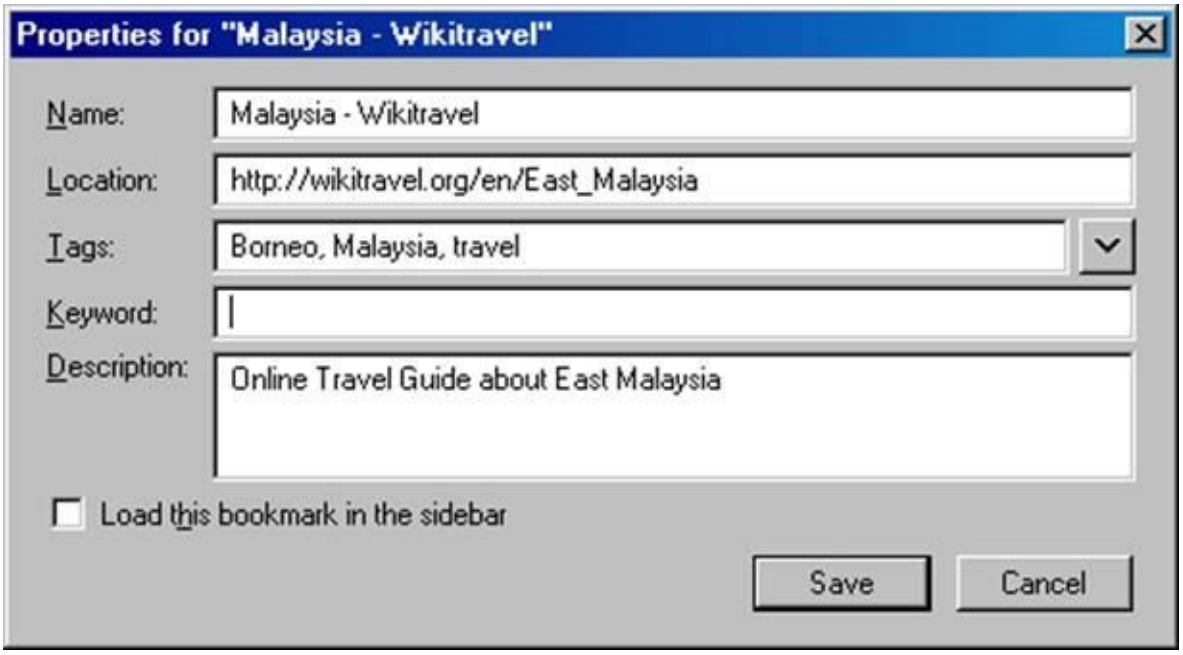
pieces of writing. You may also need to focus more on citing sources and creating bibliographies.

13 Collecting and Organizing Online Information

For all reading and research projects, you will want to collect a variety of different information items, including web pages, PDF documents, books, videos, images, *etc.* In what follows, I assume you are using a web browser (e.g., Firefox, Apple Safari, Google Chrome, or Microsoft Internet Explorer) to locate information.

These days, we spend a major part of our time on the Internet trying to find information that suits our needs. Indeed, we are going to encounter many gold mines of knowledge, but also a lot of trash. To allow us to remember the valuable information, we need to collect and organize references to the "goodies," so that we can later find them with ease.

The most popular way to accomplish this on the Internet is by bookmarking the information items (e.g., web pages, videos, books, and PDF documents) we like. A *bookmark* is a pointer to an information item, allowing you to access the information quickly. You can think of it as a small index card containing the title of the item, the web address where it can be found, and a short description *(Firefox bookmark)*:



Note: In Microsoft Internet Explorer, bookmarks are called "Favorites."

So we start out by bookmarking every interesting web page, YouTube video, *etc.* we come across, and soon we have a sizeable collection of bookmarks. At first, everything is well, but after a while, our collection becomes increasingly confusing. If we haven't done it from the start, we now begin to think about how to organize our bookmarks.

13.1 Trusted Folders and Copy Machines

The classical way to organize information (including bookmarks) is to sort it into different categories using folders.

A category might be the name of the project we are working on or the name of a school/college subject. We could also try to organize our bookmarks by subject categories, such as shopping, travel, Malaysia, Ernest Hemmingway, or Star Trek.

We end up with folders and possibly subfolders and have all our bookmarks filed into one of these folders. The advantage of creating such a folder hierarchy is that when we want to browse all web pages belonging to a certain category, we just open the related folder. So if you are a Star Trek fan, you open your folder named Star Trek and browse all bookmarks related to Star Trek.

As it turns out, however, things are not always that easy.

As you keep bookmarking, you tend to come across web pages that could or even *should* be filed into more than one folder. Indeed, most web browsers allow you to do just that. You create a copy of the bookmark in folder A, a copy in folder B, and another copy in folder C.

Usually this means that you are filing a *separate* copy of the same information in each folder. It is like taking a sheet of paper, putting it in the copy machine, making three duplicates, and then filing each of the copies in a separate folder.

What makes matters worse is that you are filing bookmarks, that is, information items that contain addresses of web pages. Unfortunately, websites tend to reorganize their web pages rather often and remove some web pages permanently. Every time the address of a web page changes, you have to change (or delete) your bookmark. Assuming you have three copies of the bookmark pointing to the same outdated web page in three different folders, you now have to change, recreate, or delete three different copies in three different folders. Most people, including this author, will eventually lose track and end up with a

mess.

13.2 Subjects and Tags

Unsurprisingly, this is not a new problem. Libraries and museums, for example, have had to organize items, such as books or artifacts, into multiple categories for at least a century.

A modern library looks at each new book to determine what subjects the book is about and enters information about the book, including the title, author, publisher, and so-called *subject headings* (essentially several keywords that describe what the book is about) into a database catalog. Library patrons, depending on their particular interest, can later use the catalog and look for books by searching for one or more subject headings.

In the Internet world, the fast-spreading concept of *tagging* allows us to do the same, that is, organize bookmarks and other information items using multiple subject names for each item. Tagging essentially means assigning one or more keywords (called tags) to an information item. Each keyword describes a different subject. If you are looking for items, just type one or more keywords, and your computer finds all items that have been tagged with at least one of these keywords. Typically, you can also see a list of all the tags used and click on anyone of them to find items that have been assigned that particular tag.

Let's stay with bookmarking and tagging for the moment and go through an example:

We are going to use bookmarking to organize online information, so that we can find it again later and manage it.

Personally, I use the online bookmarking tool Diigo.com to save and tag bookmarks in an online library. That way, I can access my bookmarks from everywhere (and share some of them with specific groups or the World).

Note: *The concepts and ideas described below should work with any bookmarking tool that supports tags. I highly recommend Diigo because, as we shall see later, it is very useful beyond bookmarking, but if you use a different*

tool (e.g., Firefox bookmarks), you should still be able to apply the concepts. Even if your web browser does not support tags, you can continue to use it. Just use your browser together with Diigo, and it should support tags.

After creating a free account at www.diigo.com and signing in, you can immediately start using Diigo. On the website, click on **Tools** to see your options:

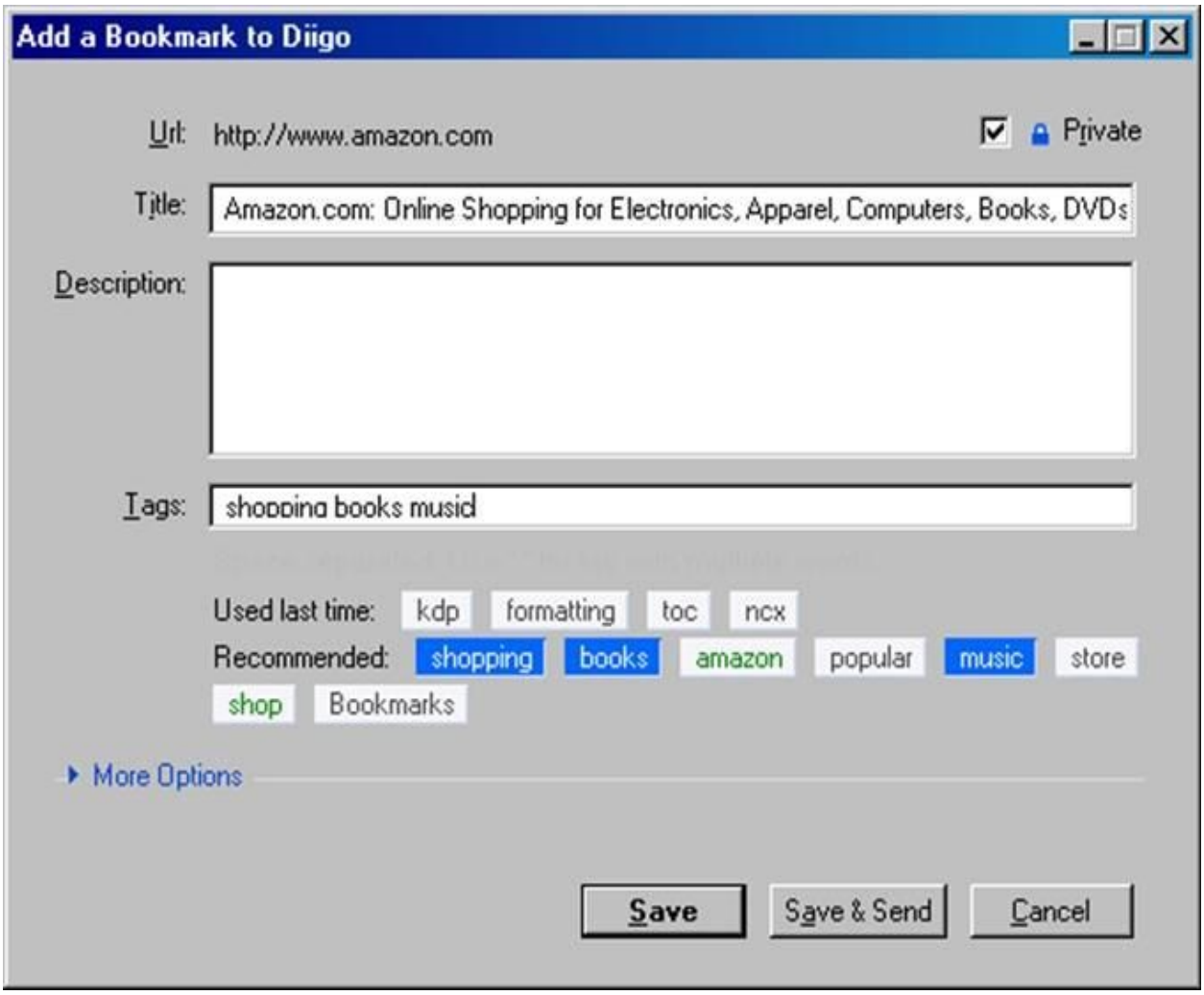
If you are using Firefox, Google Chrome, or Internet Explorer, you can install the *Diigo toolbar* (**Diigo Extension**), which looks like this:

In other web browsers, the so-called *Diigolet* offers similar functions. Choose **Diigolet** and follow the instructions.

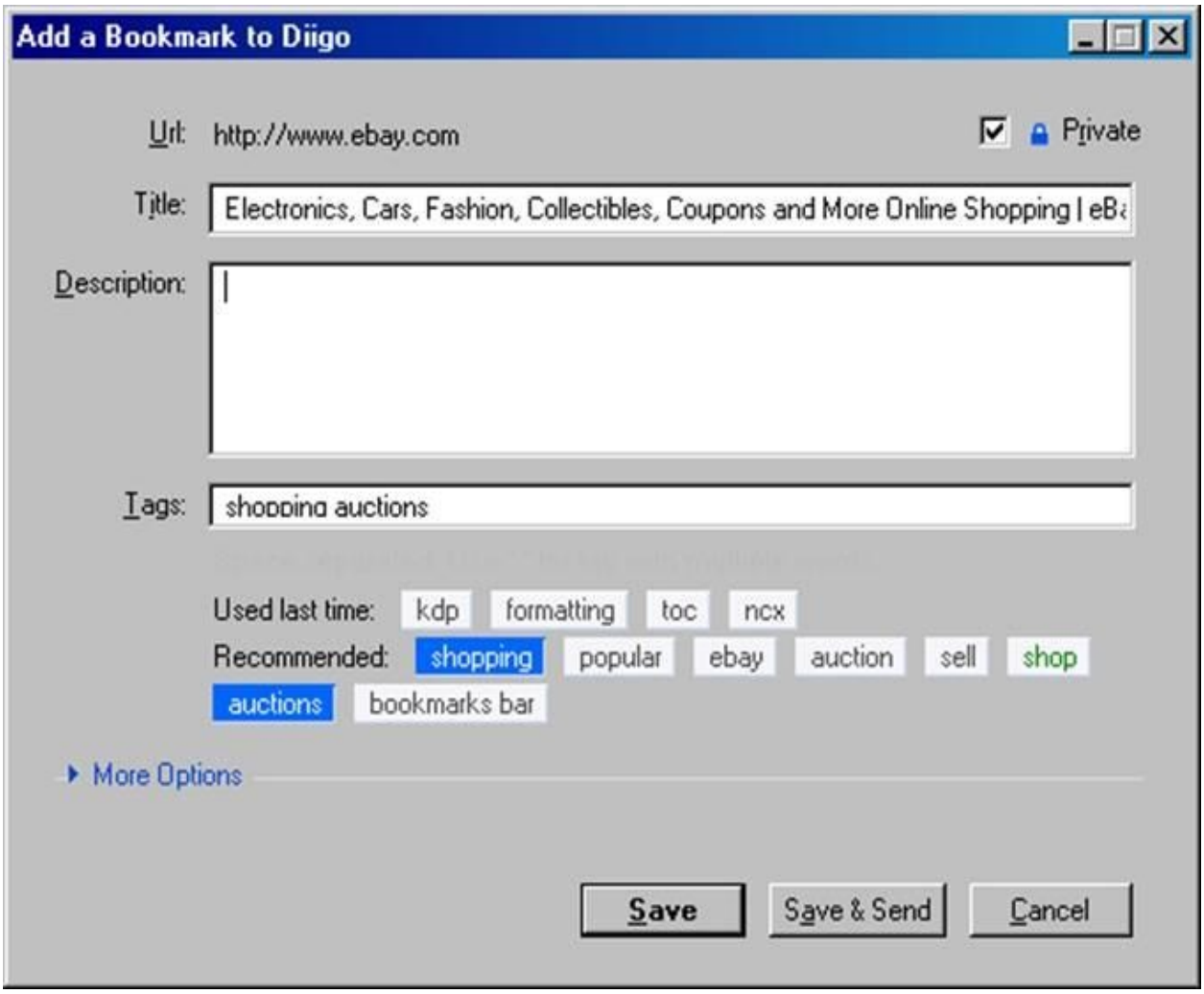
Diigolet looks like this:

Here is our first exercise:

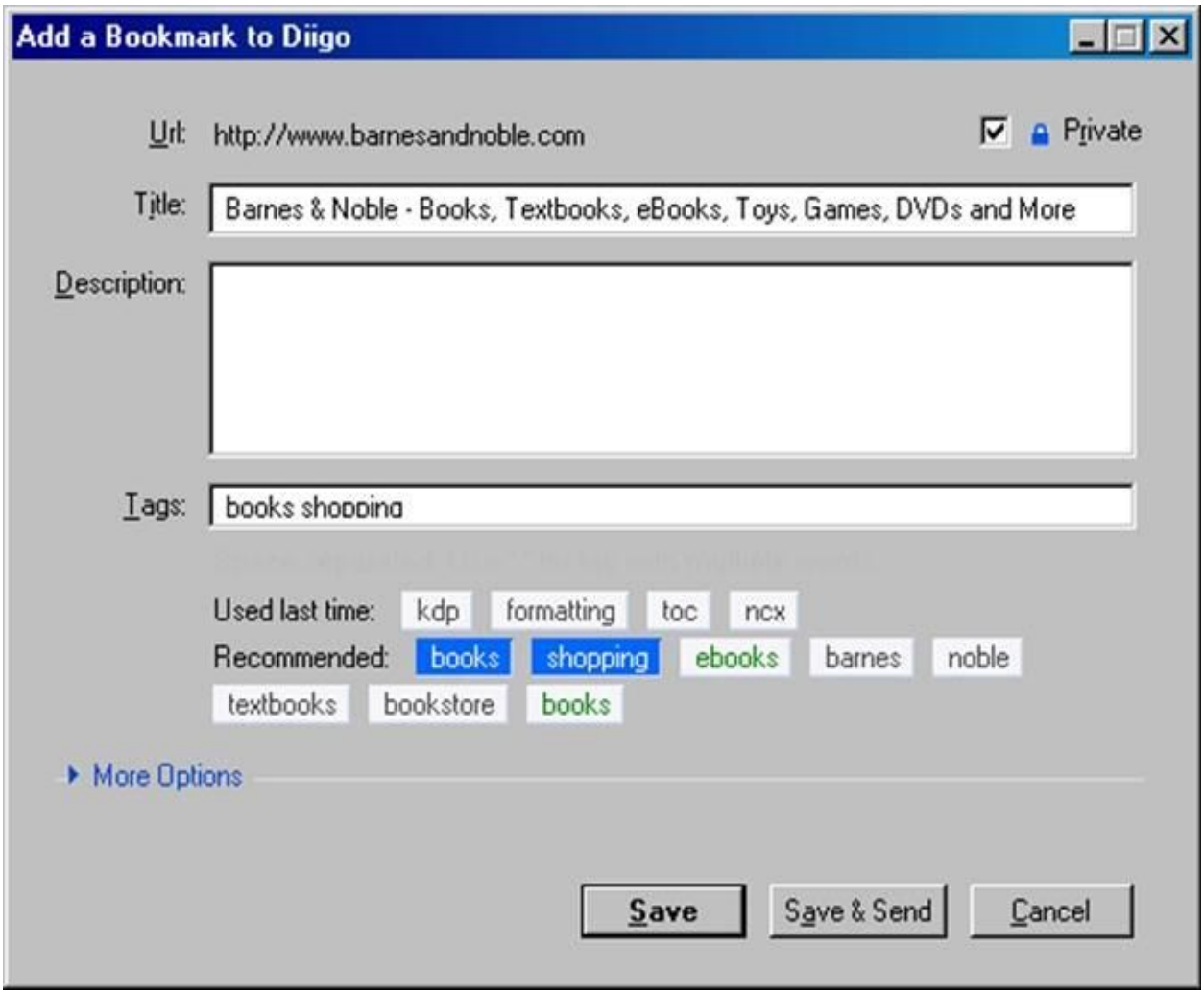
Amazon.com is a popular online shopping website selling a multitude of different items, most popular among them being books and music. Go to the website Amazon.com, bookmark it by clicking on **Bookmark**, and tag it with *shopping*, *books*, and *music*. To assign several tags to an item, just input all keywords in the field **Tags**, with a space between them:



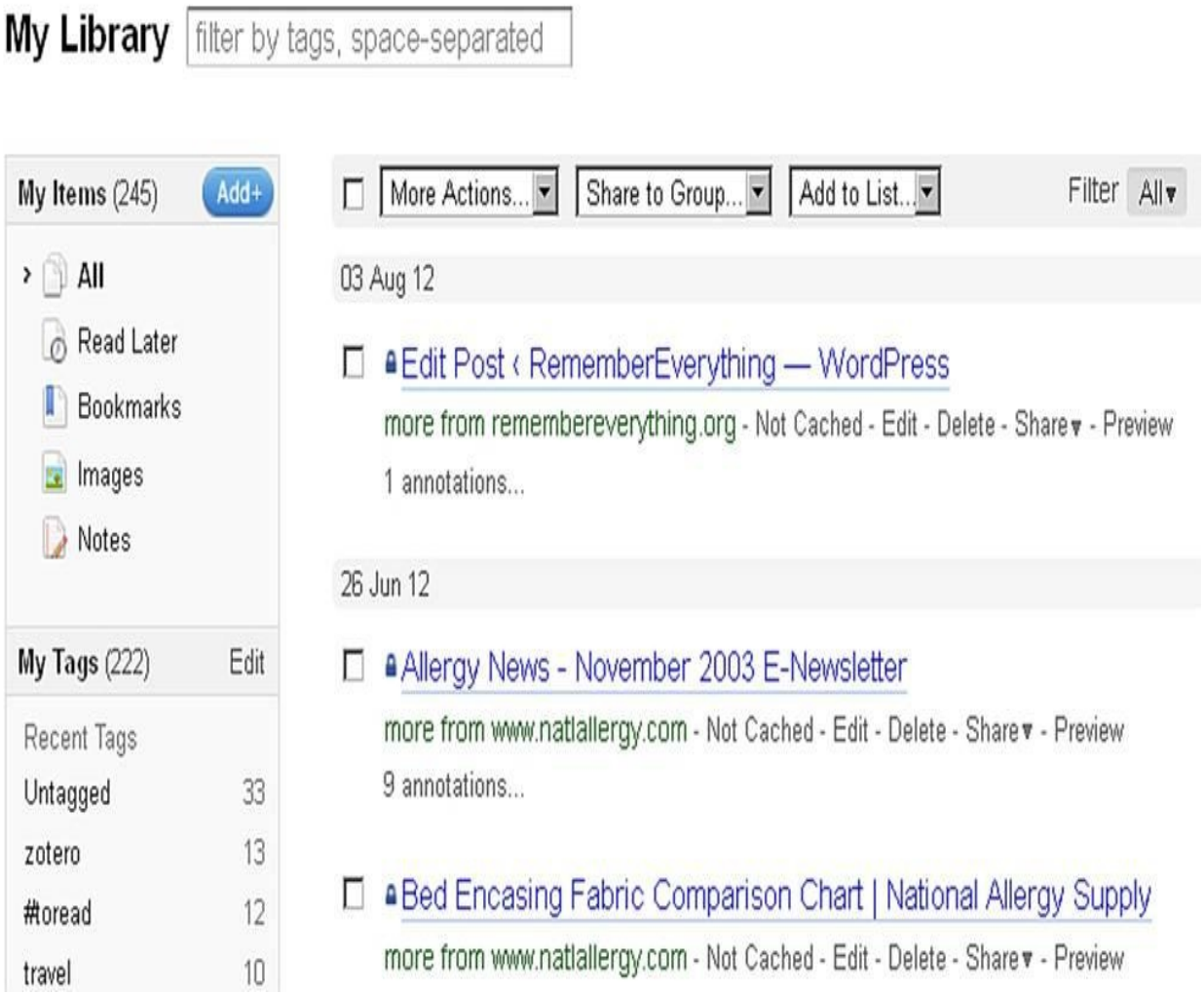
The online market place ebay.com is also about shopping. In addition, it allows us to auction off items to the highest bidder, so let's go to ebay.com as well; bookmark it, and give it the tags *shopping* and *auctions*.



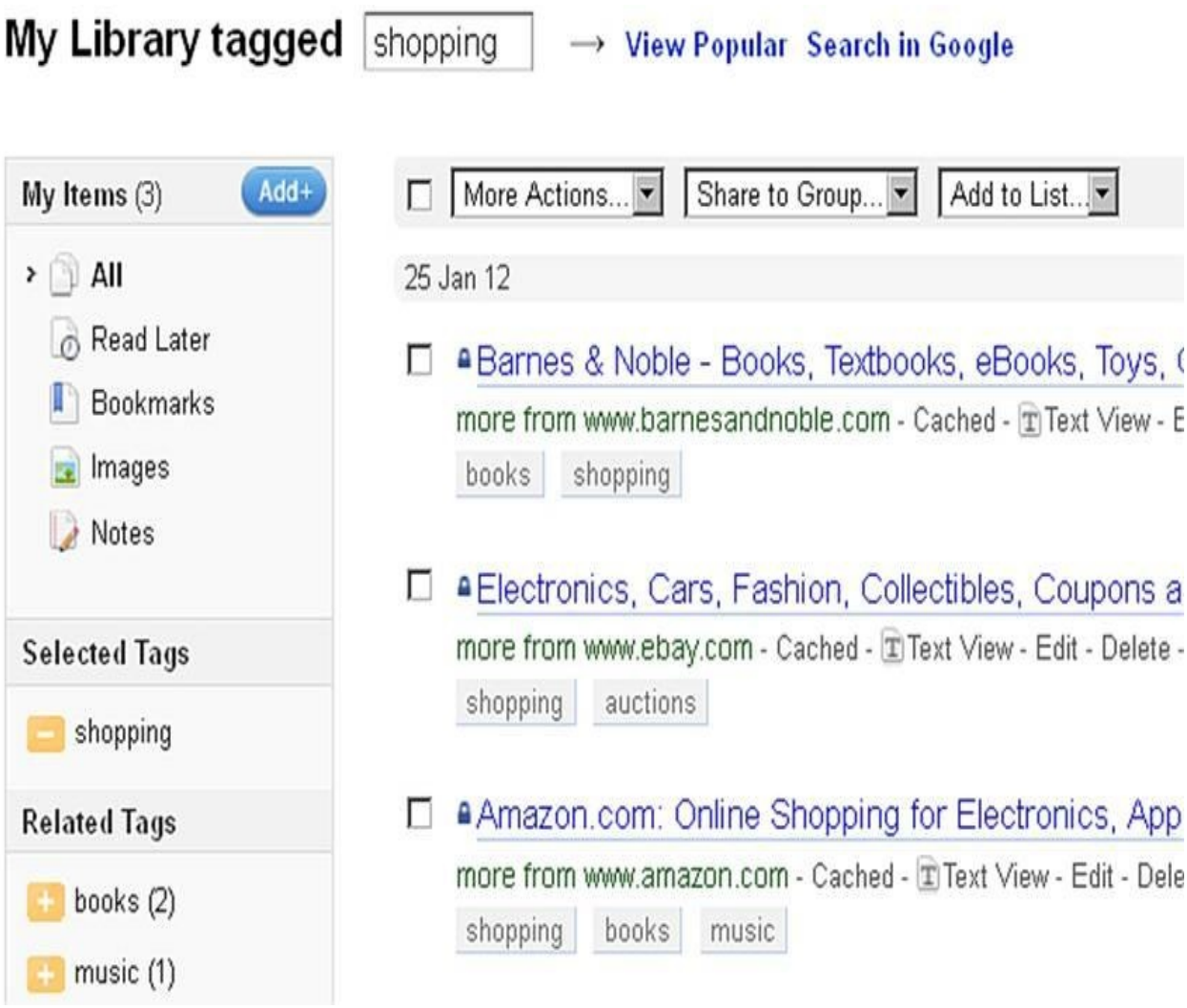
Barnes and Noble (barnesandnoble.com), a large U.S. book vendor, is also keeping a website. Again, we bookmark it and use the tags *books* and *shopping*:



To find your bookmarks, just open your Diigo library from the Diigo toolbar/Diigolet by clicking on **Diigo** and selecting **My Library**. Then type one or more keywords in the search field to get all bookmarks tagged with these keywords. Initially, my library looked like this:

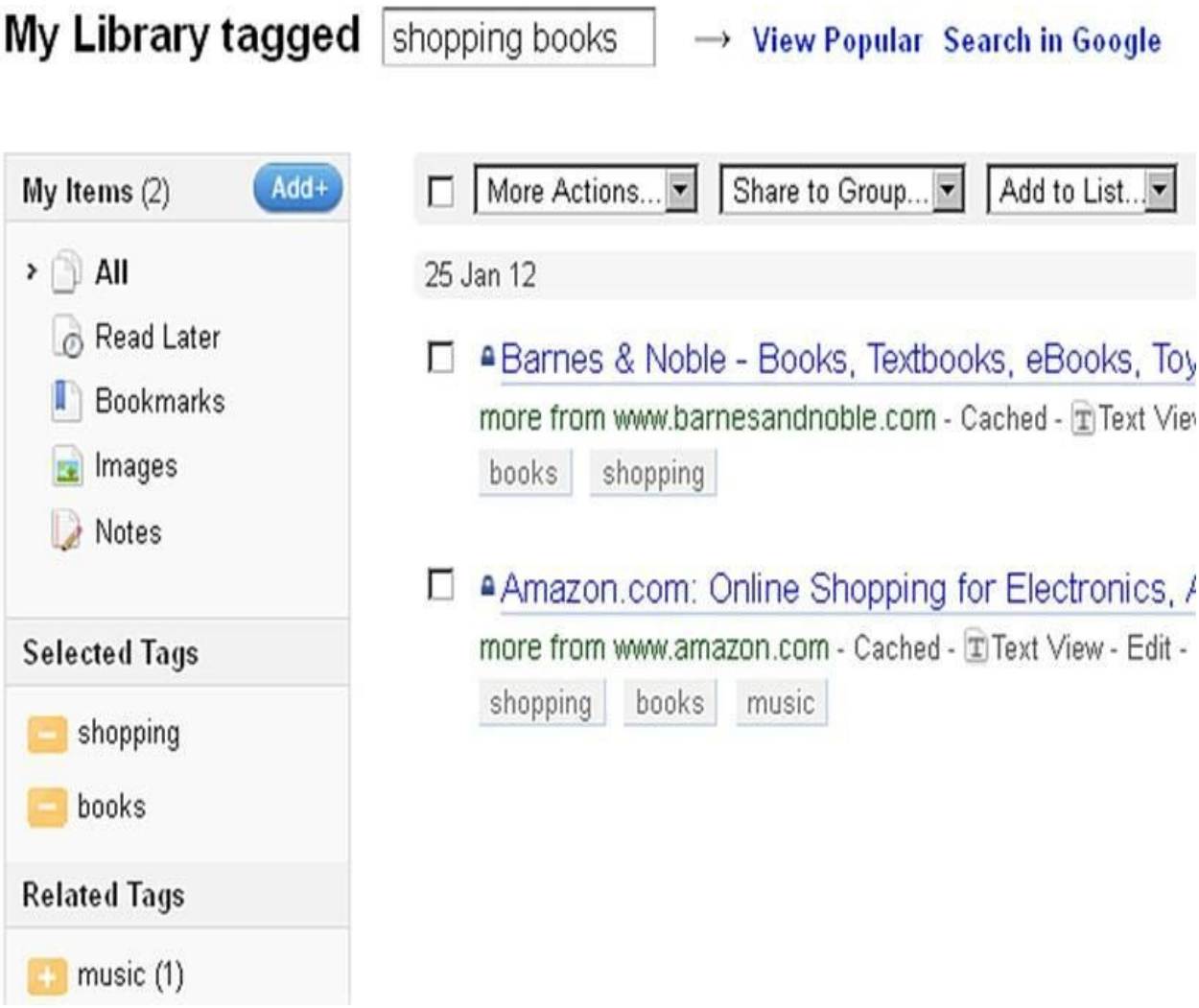


Let's say we are looking for all web pages tagged with *shopping*, so we type the tag **shopping** into the input field next to **My Library**:



We get exactly the three web pages we tagged with *shopping*.

Notice that Diigo also shows related tags, that is, all the tags we assigned in addition to the tag *shopping*. By clicking on the **plus sign** next to *books*, we get all web pages tagged with *shopping* and *books*:



Of course, we could have typed the tags *shopping* and *books* right from the start and would have gotten the same result. Also, note that the order in which you type the tags does not matter.

How should you choose your tag names?

The most important rule is to be consistent. If you want to express the same subject, concept, or idea, you need to use the same tag. The main reason for using tags is to allow us to find information fast – we type (or select) one or more keywords and let our computer find all items that have been tagged with these keywords.

In the example above, we assigned the tag *shopping* to all websites offering online shopping. Now suppose the first time we used the tag *shopping*, then

shops, and finally *stores* to tag our online shopping websites. These tags wouldn't be of great value because none of them would yield all online shopping websites.

Should you use singular or plural when tagging an item?

My advice is to follow your natural language usage. Amazon.com sells *books*, and the online library catalog WorldCat.org can be used to find *books*, so, IMO, the tag for both should be *books* rather than *book*. If you wanted to tag a bookmark referring to a web page introducing *a single book*, you would use the tag *book*.

Don't get too caught up with this though. The most important thing is to be consistent when assigning tags. When you mean the same thing, give it the same name.

13.3 Organizing and Finding Items according to Projects and other Contexts

We have just covered how to use tags to organize information according to subjects. Let's now go a step further: in most cases, when we research, collect, and organize information items, we do it in a certain context, for a particular project, class, *etc.*

Projects could include planning a holiday or business trip, writing a blog post or research paper, learning a particular skill, collecting items for a particular school/college course, collecting all items related to a particular author, *etc.*

We could file all items belonging to a particular project into a folder. Some programs (e.g., the popular web browser Firefox) provide the opportunity to combine folders and tags as organizational tools.

You could use folders to collect all bookmarks that belong to a particular project and assign tags to organize your bookmarks according to subjects. Browse a folder to find all items related to your project, or do a tag-search for all items related to one or more subjects. I have used this strategy for a number of years, and it tends to work well. The main drawback is that if you want to use a bookmark in different projects, you again need to create copies.

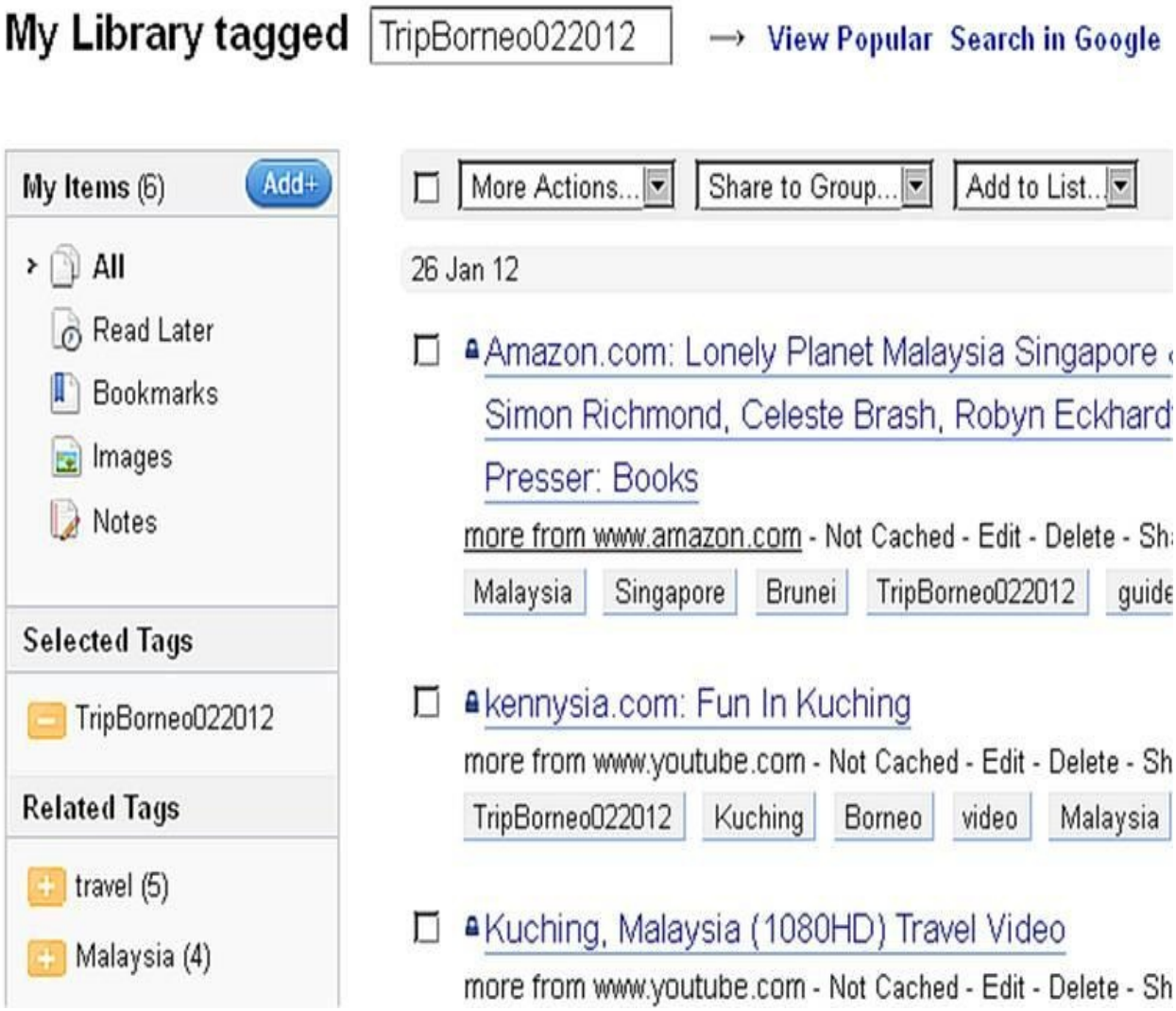
Alternatively, we can also use an additional tag to associate our bookmarks with a project.

Here is an example: In a couple of months, I plan to go on a trip to the Malaysian part of Borneo (a large island in South East Asia). For this trip, I am currently doing research on the Internet. I want to book a flight, plan an itinerary, find and book hotels, collect and read some books on Borneo, and buy at least one guidebook to accompany me on my trip. I am also looking for some videos about Kuching, a large city on Borneo on YouTube.

Instead of creating a folder *TripBorneo022012* to collect all bookmarks, I defined and assigned a tag *TripBorneo022012* while searching for and bookmarking web pages related to my trip. In addition to the project tag, I also

assigned the usual subject tags to the web pages.

Filtering my library using the project tag, I can now find all web pages related to my project:



Naming conventions for project and other context tags

To distinguish between subject tags (which describe what a certain item is about) and project tags (which are related to the project, course/class, research, *etc.* we are currently working on), I suggest you use clearly defined *prefixes* for your project tags.

Type	Prefix	Example
Trip	trip	tripBorneo022012
Project	prj	prjresearchworkflow
Class/Course	cls/crs	crscomm101
....		

By all means, use names you feel comfortable with.

Note: *Some people also use a special character, such as '#' or '_', in front of a project tag to distinguish it from subject tags.*

13.4 Using Tags to Let Your Work Flow

While collecting bookmarks, you may want to remember what you intend to do with a particular item. For this purpose, you can tag the bookmark with a *workflow tag* indicating what you, other people, or computer programs need to do with it.

For example, when bookmarking multiple items at the same time, you might want to indicate for each item that you still have to read it. After you have performed the indicated action, you just remove the related tag and possibly assign a new tag.

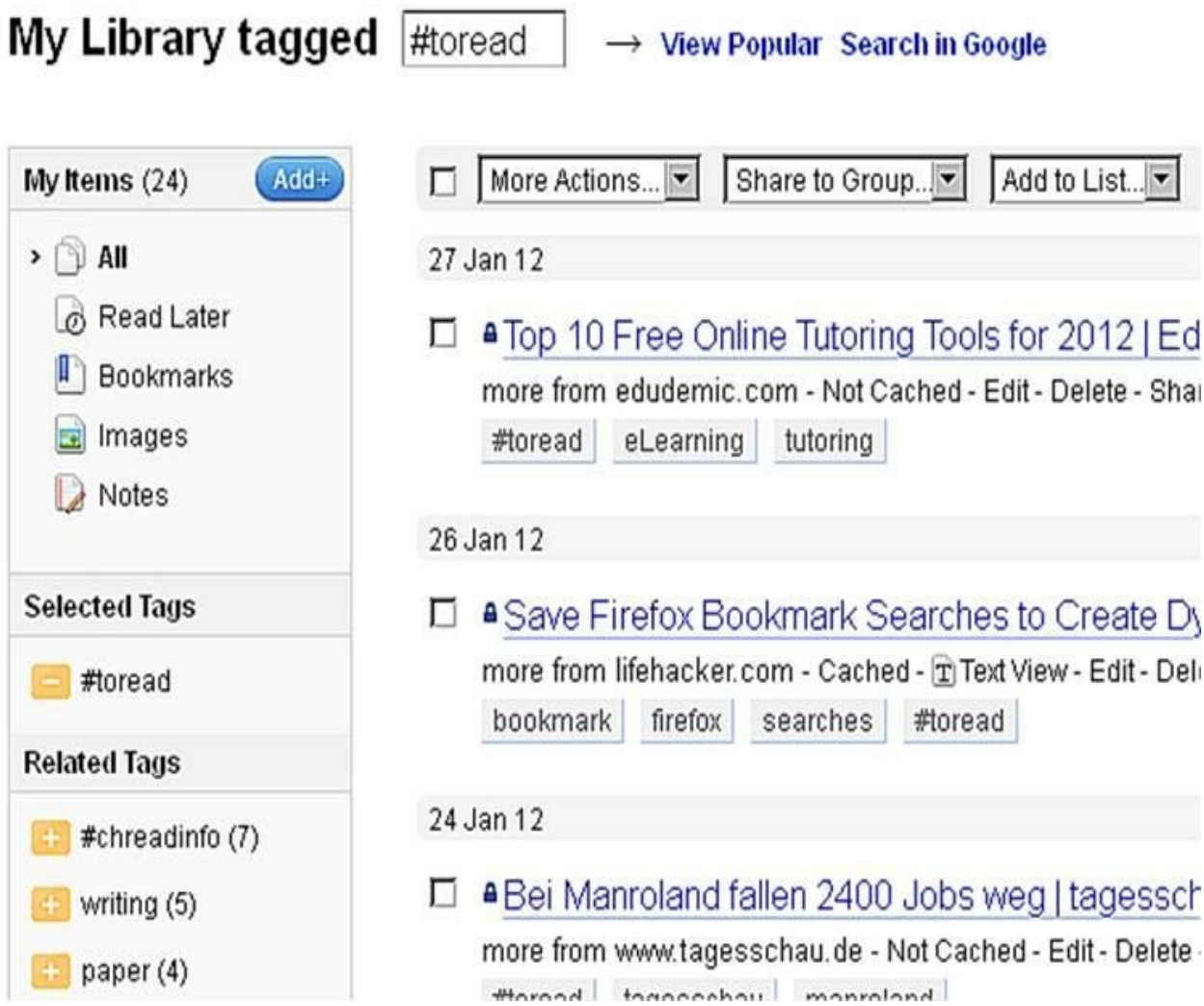
This is a time-tested strategy used in commercial workgroup software (e.g., IBM's Lotus Domino), as well as email, mind mapping, and note-taking applications (which frequently use graphical symbols as tags). To distinguish workflow tags from normal tags, use a special character, such as '#' or '_', as a prefix.

Here are some suggestions:

Tag	Action/When
#toread	Unread.
#clarify	Some information is unclear.
#obtain	You need to buy the book or get it from a library. You need to download the video etc.
#discuss	Discuss with a classmate or coworker.
#share	You want to share this item with other people.
#wait	You are waiting for input from another person.

Tip: *For more ideas, check the tags Microsoft OneNote offers. Some of them are described in section (16.3).*

Let's look for all unread items in my bookmark library:


My Library tagged #toread → View Popular Search in Google
My Items (24) Add+
All
Read Later
Bookmarks
Images
Notes
Selected Tags
#toread
Related Tags
#chreadinfo (7)
writing (5)
paper (4)
More Actions...
Share to Group...
Add to List...
27 Jan 12
Top 10 Free Online Tutoring Tools for 2012 | Ed
more from edudemic.com - Not Cached - Edit - Delete - Sha
#toread eLearning tutoring
26 Jan 12
Save Firefox Bookmark Searches to Create Dy
more from lifehacker.com - Cached - Text View - Edit - Del
bookmark firefox searches #toread
24 Jan 12
Bei Manroland fallen 2400 Jobs weg | tagessch
more from www.tagesschau.de - Not Cached - Edit - Delete

14 Beyond Bookmarks – Your Personal Electronic Library

So far, we have talked about collecting and organizing bookmarks. We use tags to organize bookmarks according to subjects, projects, and workflow steps. It is important to note that when we organize bookmarks, we don't organize the information items themselves, but rather pointers (= index cards) to these online information items (*see Diigo bookmark below*):

This is fine and may be all we need in terms of organization as long as we are connected to the Internet and mainly concerned with reading web pages.

The limits of bookmarking as a tool to organize information

Briefly skimming websites, individual web pages, and book descriptions and bookmarking items of interest is almost always an efficient first step to collect information for reading and research. Furthermore, many web pages are constantly updated, so in many cases it is more important to save where to find the information rather than the information itself (which may be outdated tomorrow).

On the other hand, in many instances, we eventually want to collect the information item itself. This is where Internet bookmarking isn't going to do the trick. After all, we have no control over a web page on the Internet. It might be

gone tomorrow.

In addition, to use and properly cite an item in research, we need to collect *bibliographic information*.

Bibliographic information is all the information necessary to describe an information item. In the case of a book, this includes the author, date, title, and publisher. In the case of a journal or magazine article, we need the author, title of the article, title of the journal, year, volume, and issue, *etc.*

If an information item, such as a book, article, podcast, or video, is available online (either free or through purchase), we might also want to store and organize the item itself, so that we can read and annotate it, or watch it and take notes.

Archiving web pages we have used in our research is particularly important. We may be able to read the page now, but we cannot be sure it will still be available in a year or so. In addition, we also need to collect and save our own notes, ideas, outlines, *etc.*

How about using files and folders on our computer to collect this information?

Of course, we can save all documents in a folder hierarchy on our computer's hard disk or "in the cloud" using a file service like Dropbox (dropbox.com) and, properly managed, find most of the information again.

It does, however, take considerable time to input and manage bibliographic information, and the search options in our computer's file system are limited at best. On many computers, it is more like, "Documents check in, but never out." For a start, try to find all documents by a particular author or all documents related to a specific subject (independent of the project in which they have been used). If you haven't thought about this while organizing your documents, it can become a real pain.

14.1 Creating Your Personal Electronic Library with Zotero

To make it easy to organize books, articles, videos, web pages, *etc.* and at the same time save bibliographic information, I suggest you create your own personal electronic library. It is easier than you may think.

The free tool Zotero (Zotero.org) lets you build such a personal library and store all the information with the click of only a few buttons. You can keep your library private or create group libraries and share them over the Internet. Should you need to cite information and/or manage a bibliography, Zotero also allows you to do this in all common styles.

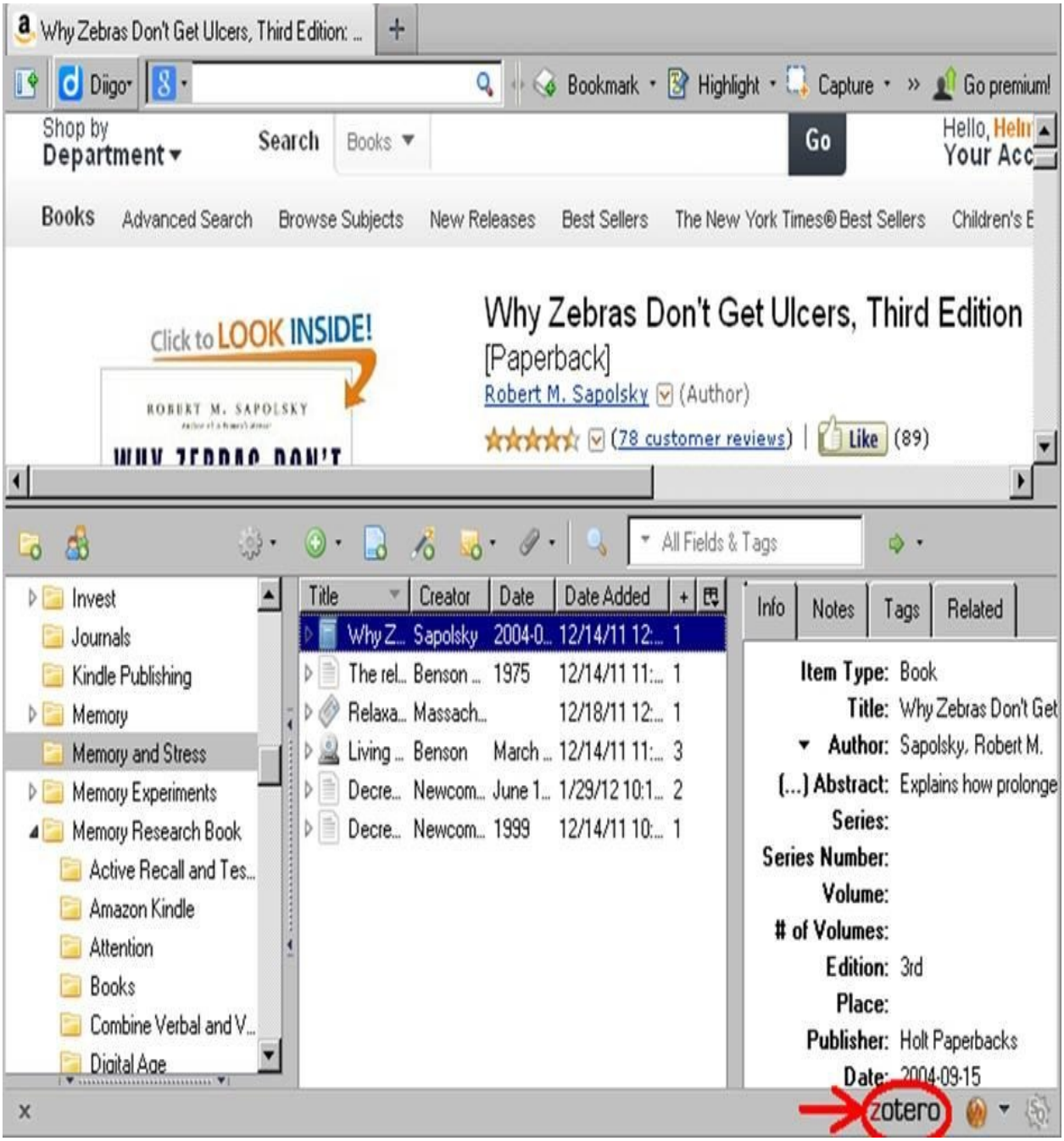
Zotero is a project of the Roy Rosenzweig Center for History and New Media of George Mason University in Fairfax, Virginia (chnm.gmu.edu). You can download it directly from the website www.zotero.org.

It is available as a Firefox add-on, in which case it resides in your web browser, and as a stand-alone program that works with Firefox, Apple Safari, and Google Chrome.

This is how Zotero is described on its home page (zotero.org): "**Zotero** [zoh-TAIR-oh] is a free, easy-to-use tool to help you **collect, organize, cite, and share** your research sources. It lives right where you do your work—in the **web browser** itself."[51]

After installing Zotero as an add-on to Firefox, you get a small *zotero* button in the lower right corner of your web browser (see image below):

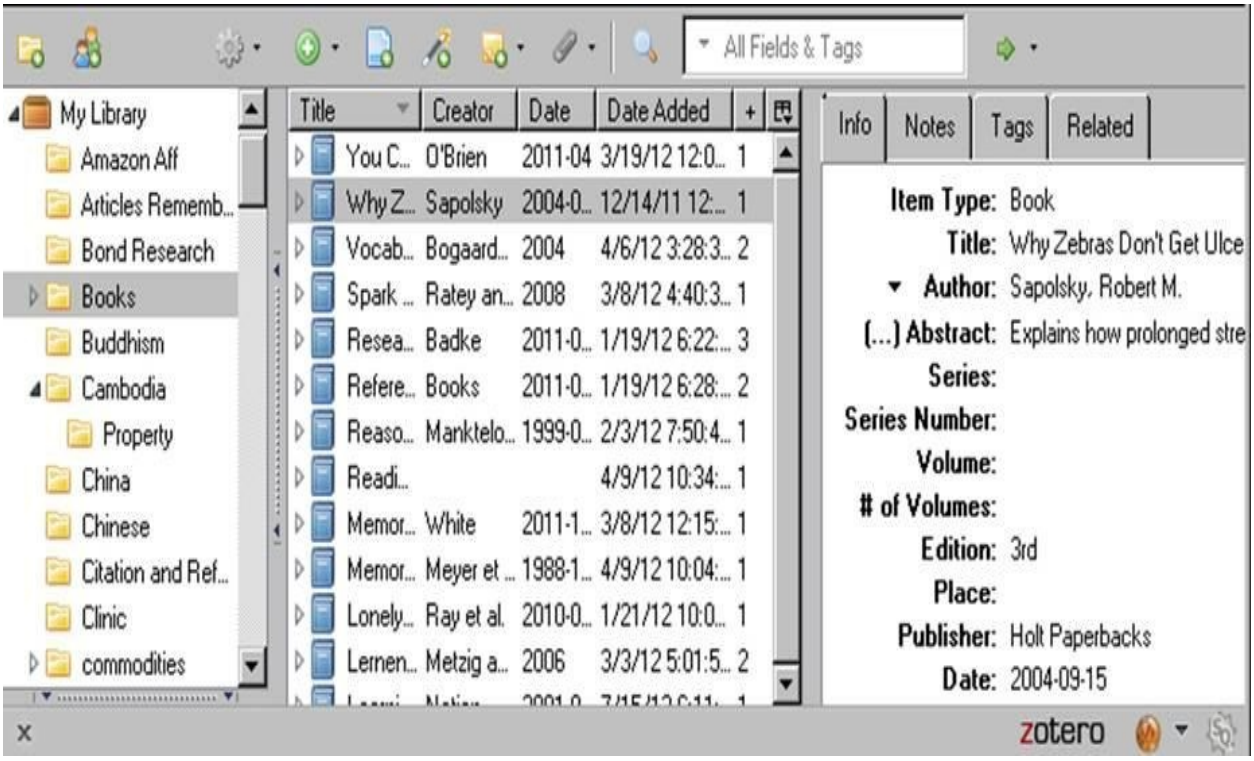
Click on the **zotero button** to open your Zotero library:



Zotero's user-interface consists of three panes. In the left pane, you find *My Library*, which contains all the collections you have created. In the middle, you see all items contained in the currently selected collection (here Memory and Stress). To the right, you see the bibliographic information of the currently selected item. You can also create notes, assign tags, and relate an item to other items.

To organize your items, Zotero offers you a variety of tools, including tags (as discussed earlier) and the just-mentioned *collections*. Collections are similar to folders in the sense that you can create a hierarchy and organize items into different collections and sub-collections (as you can with folders).

However, they come with an important advantage: In a traditional folder hierarchy, an item (e.g., a document, video, etc.) can only be filed in one folder while in Zotero you can assign an item to several collections at the same time. In the previous screenshot, I have created a collection *Memory and Stress* to collect all items for an information research on the impact of stress on human memory. This collection contains, among other items, the book *Why Zebras don't get Ulcers* by Robert Sapolsky. I have also created a second collection *Books* and added the book to this collection as well:



Collections are also a very elegant way to use the same item in different projects!

The following important points apply:

- All items (no matter to which collection you added them) can always also

be found directly in the root collection *My Library*.

- If you are adding an item to multiple collections, you are not creating duplicates. This implies that when you change an item in one collection, for example, by adding a note or assigning tags, this item is also changed in all other collections in which it resides.
- Removing an item from one collection (for example, Books) does not remove it from other collections in which it resides. To remove an item from all collections, including My Library, you use the function *Move item to Trash*.

14.2 How Do You Collect Information Items with Zotero?

Generally, items are always added directly to My Library. In addition, items are added to the currently opened collection.

Zotero can automatically sense items (including their bibliographic information) from many different websites, including many library catalogs, academic journals, databases, Google Scholar, Amazon.com, *The New York Times*, CNN.com, Yahoo.com, YouTube.com…

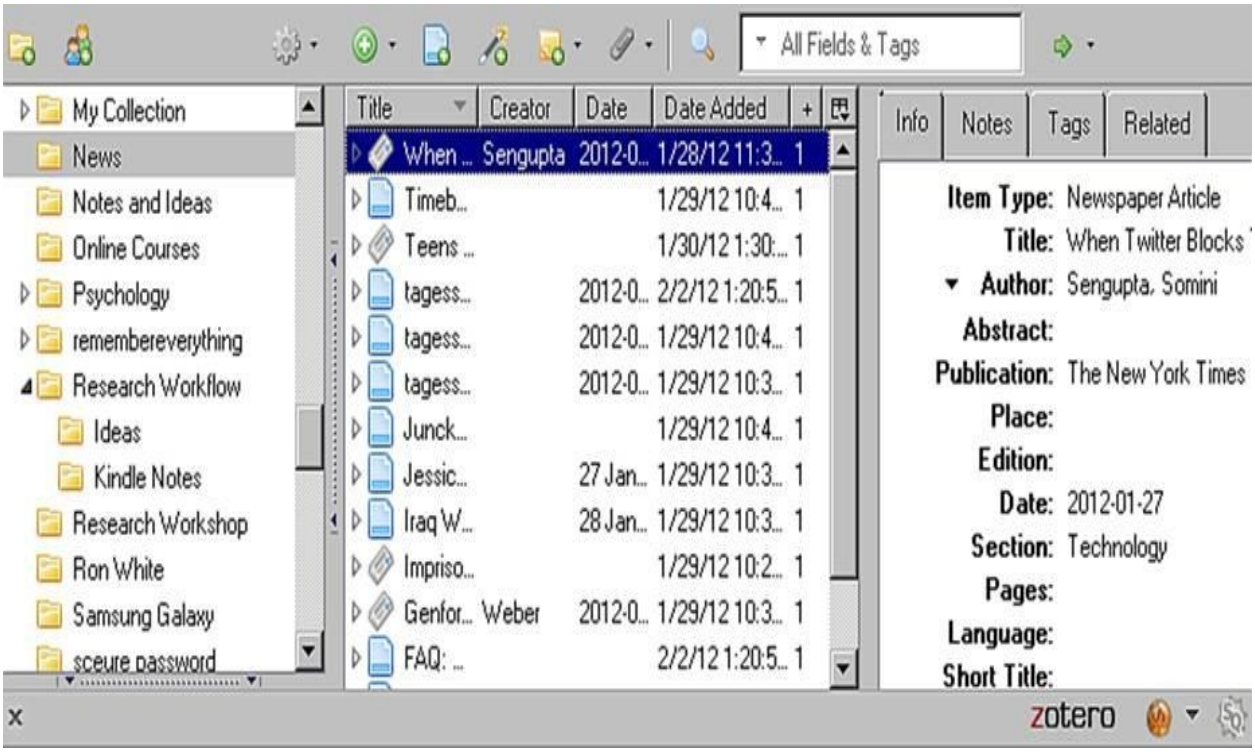
Let's go to *The New York Times* website and choose an article to see how it works.

When Twitter Blocks Tweets, It's #Outrage - ...
www.nytimes.com/2012.
Wikiped
Diigo
newyork times censoring tweets
Bookmark
Censoring of Tweets Sets Off #Outrage
By SOMINI SENGUPTA
Published: January 27, 2012
SAN FRANCISCO — It started five years ago after a young engi
in San Francisco sketched out a quirky little Web tool for telling
friends what you were up to. It became a bullhorn for millions o
people worldwide, especially vital in nations that tend to muzzle
own people.

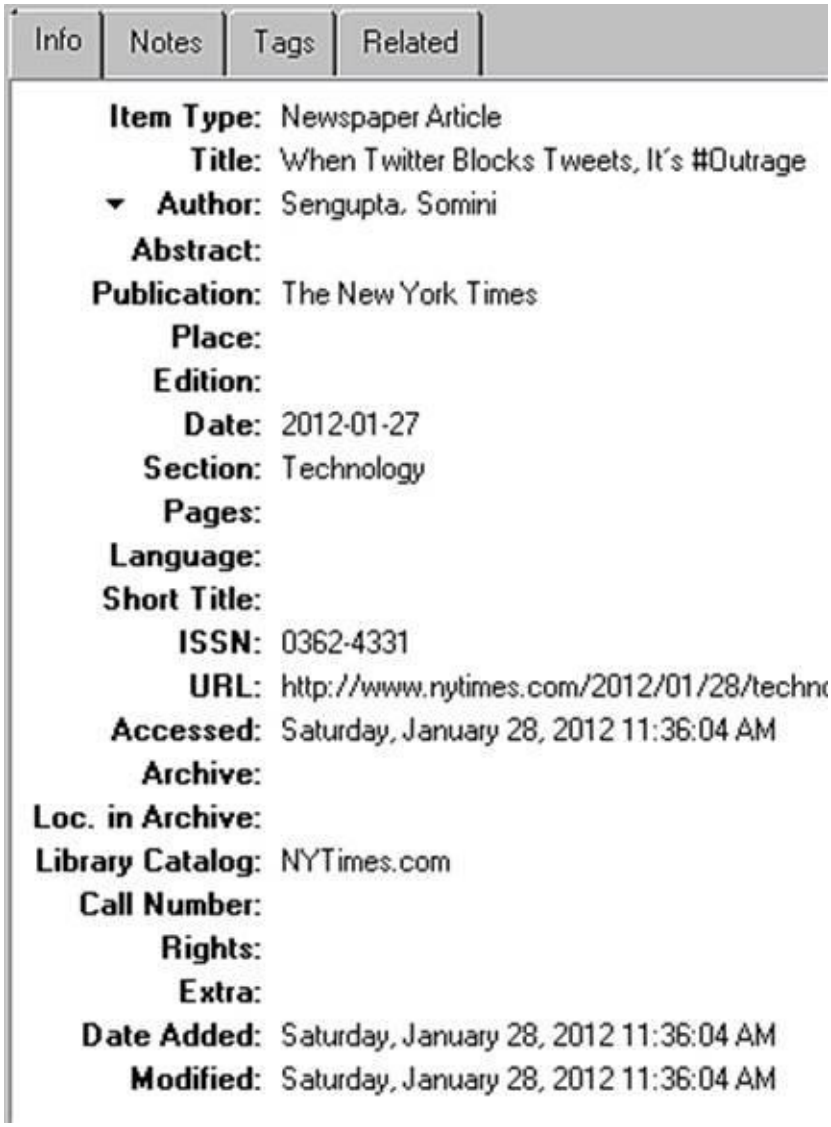
In this example, I have chosen the article "Censoring of Tweets Sets Off #Outrage." In the address bar, next to the web address, you can see a small *newspaper icon*. This means that Zotero has recognized the article as a newspaper article. Upon clicking this **icon**, the bibliographic information and a snapshot of the article are being saved to My Library. You get a status

notification, “Saving Item.”

I have previously created and opened the collection *News*, so the result in Zotero looks as follows:



With one click, Zotero has saved a snapshot of the article (so you can read it even when you are not online) and an extensive record of bibliographic information about the article:

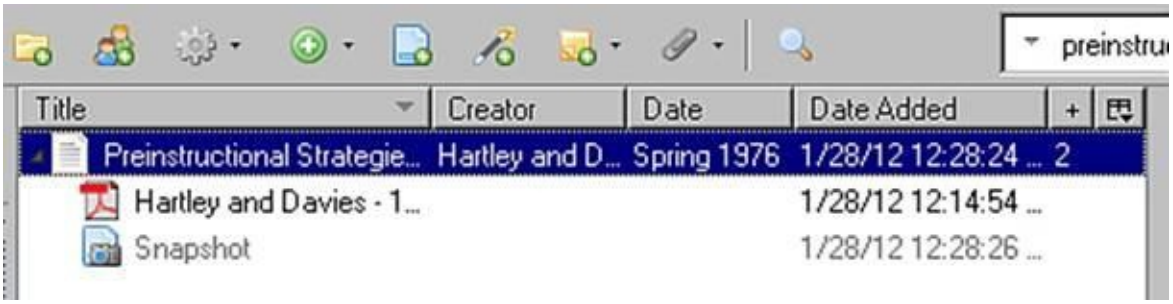


For different types of information items, Zotero displays different icons.

For example, when Zotero senses a book, you get a book icon:

For a journal article, we get a document symbol:

Since the website in this example offers the full-text article as a PDF file, Zotero saves the file as well:



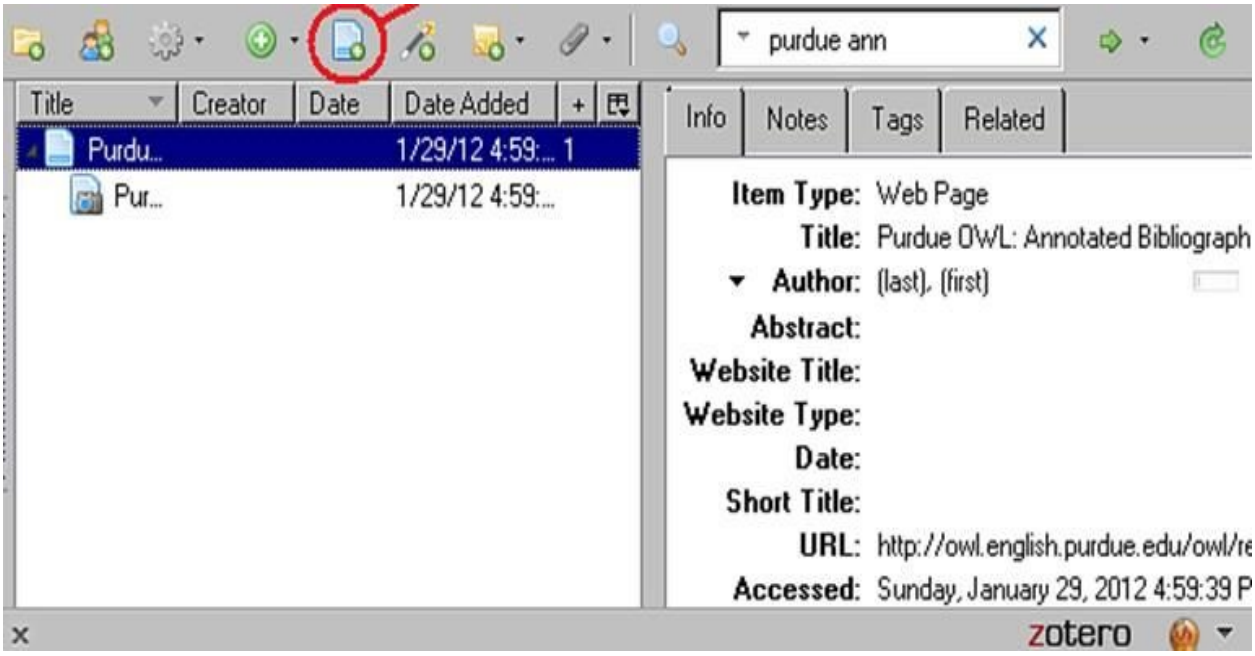
Here is an overview of the most common item types and icons:

Item	Icon
Web Page	
Book	
Book Section	
Blog Post/Magazine Article	
Newspaper Article	
Journal Article	
Audio	
Podcast	
Video/ TV Recording	
List of items	

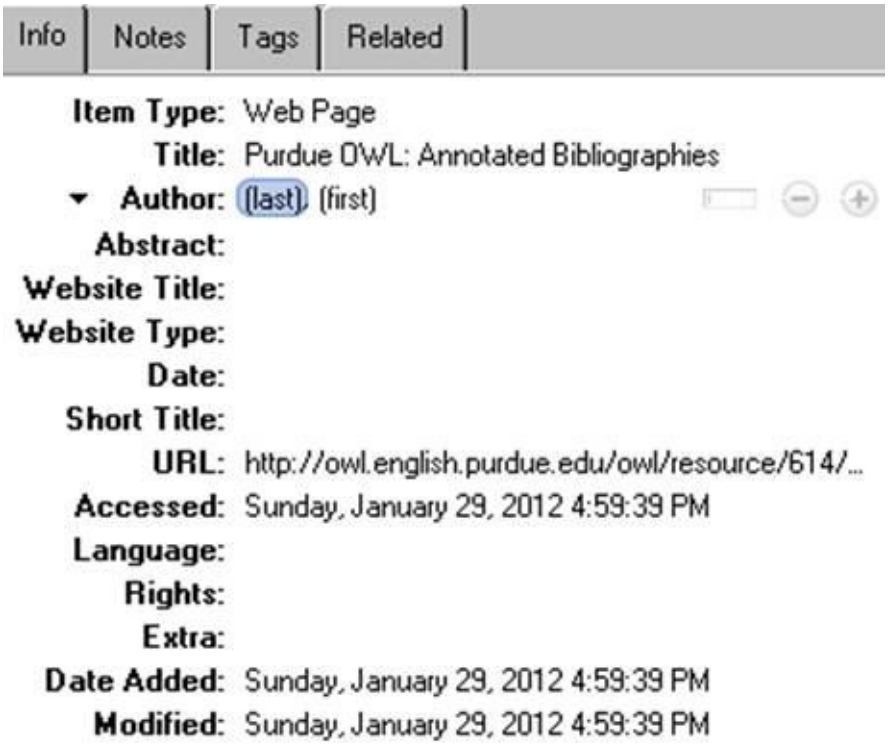
What can you do if Zotero doesn't detect the item type on a web page?

Even when Zotero does not automatically detect an item type or detects the wrong type, you can still easily capture the item.

In this case, just open Zotero, and click on the red-circled icon (*see screenshot below*). This saves the item as a normal web page and creates a snapshot, so that the page becomes available for offline viewing:



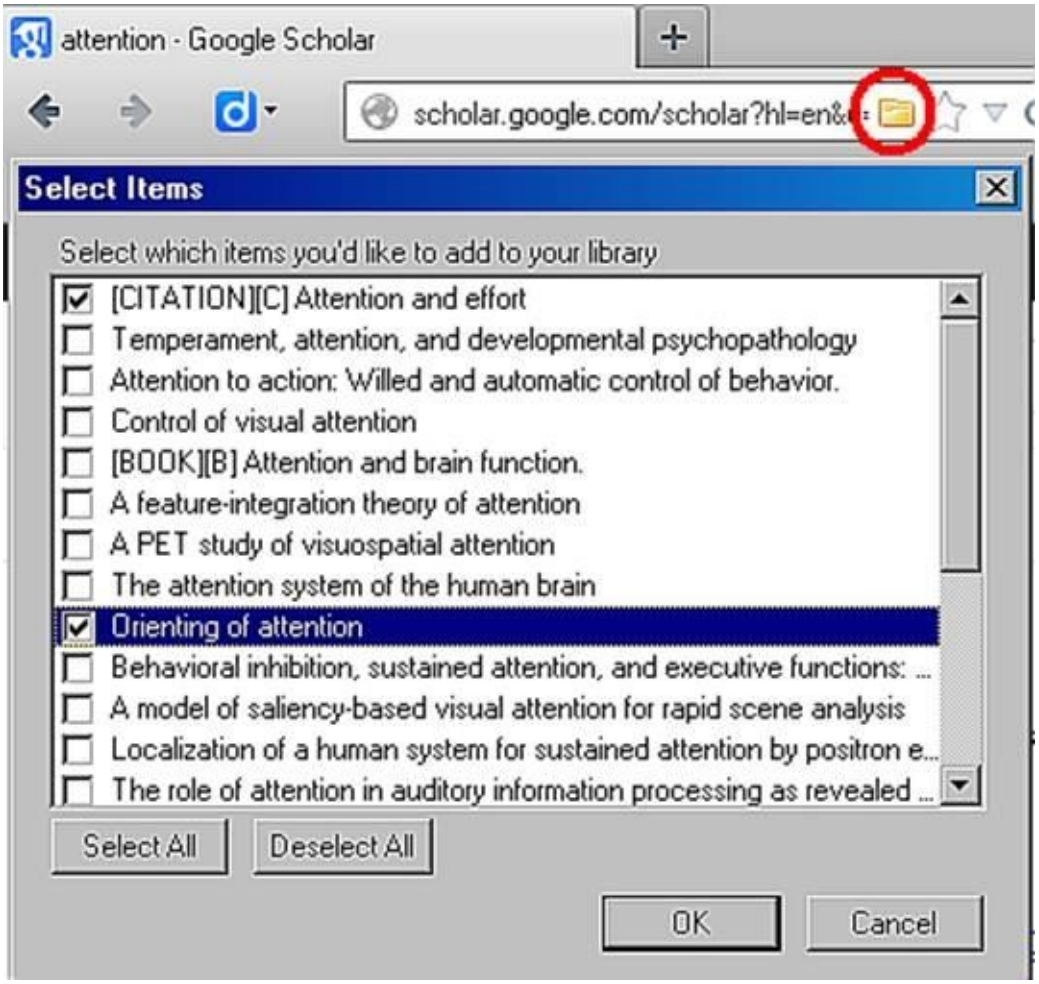
This is the related bibliographic entry, as created by Zotero:



You still get most of the bibliographic information you need to cite the web page, but you may have to input the website title (i.e., the organization), author name, and date manually. Very often, this information can directly be copied from the web page.

14.3 Collecting Items from Library Catalogs and Databases

Many library catalogs, journal databases, and websites like Google Scholar allow you to search for all items matching certain criteria and display a list of results for the search. With Zotero, you can save several or all results at the same time. Let's go to Google Scholar and search for the keyword *attention*. We get a list of results, and a *folder icon* appears next to the web address:


attention - Google Scholar
scholar.google.com/scholar?hl=en&
Select Items
Select which items you'd like to add to your library
[CITATION][C] Attention and effort
Temperament, attention, and developmental psychopathology
Attention to action: Willed and automatic control of behavior.
Control of visual attention
[BOOK][B] Attention and brain function.
A feature-integration theory of attention
A PET study of visuospatial attention
The attention system of the human brain
Orienting of attention
Behavioral inhibition, sustained attention, and executive functions: ...
A model of saliency-based visual attention for rapid scene analysis
Localization of a human system for sustained attention by positron e...
The role of attention in auditory information processing as revealed ...
Select All
Deselect All
OK
Cancel

Clicking on the **folder icon**, we get a selection box and can choose for which items we want to save the bibliographic information. Zotero saves the information for all items we have chosen and attempts to save the full-text article whenever available.

14.4 Organizing Information Items Using Collections and Tags

Since an item can be in several collections at the same time, we don't need to use tags to overcome the limitations posed by classical folders.

You might ask, "When should I use collections and when tags?"

My suggestion is to use collections to represent projects, courses, classes, etc., that is, the context in which you are collecting information items; use tags to organize the items by subjects (as in Diigo).

Suppose you are writing a book. You would create a collection for this book project. For each chapter, you could create a sub-collection. If you were doing information research for a course, you would create a collection for the course and possibly a sub-collection for each of the main topics covered in the course. If you plan to go on a holiday, create a collection for your trip.

You can also create collections to support your workflow. For example, you could add all the articles you still need to read to a collection named *Toread* and all books you still need to get from the library to an *Obtain* collection.

Tip: *Alternatively, assign workflow tags, and use so-called "Saved Searches" to create smart collections, which are automatically populated with all the items tagged with a particular workflow tag. To create a Saved Search, click on the* ***magnifying glass*** *in Zotero.*

Since an item can be in several collections at the same time, using workflow collections does not preclude you from adding a book or article to the project collection(s) to which it belongs. I also use collections to organize items to support my work and as temporary containers for research.

For example, when I want to collect a research paper and all works cited in that paper, I create a specific collection for it and, in addition to the paper, add all papers citing it. After skimming through all the papers, I might organize some of

them in other sub-collections and completely remove others.

14.5 Organizing Books with Subject Headings

In addition to organizing information items according to projects, courses, and workflows, you may still want to organize these items according to the subjects to which they belong.

Earlier, I mentioned that libraries look at each new book, determine what subject(s) the book is about, and enter this information, including the title, author, publisher, and so-called *subject headings* (essentially keywords that describe what the book is about) into their library catalog.

Library patrons, depending on their particular interest, can use the catalog and look for books by searching for one or more subject headings. This is very useful because in many instances the book title does not clearly state what subjects a book is about. What's more, one book may be related to quite a few different subjects.

For your personal library, you are the librarian, so the duty to enter subject headings falls upon you. At your disposal you have your trusted tags, so in Zotero again add keywords representing your subject headings as tags. As discussed earlier, to make sure that you can later find items related to a subject, you need to be consistent with your tags. For example, decide in advance if you want to tag online retailers with the keyword *shopping* or *stores*, and then always use the same name.

How controlled vocabularies can help you to tag

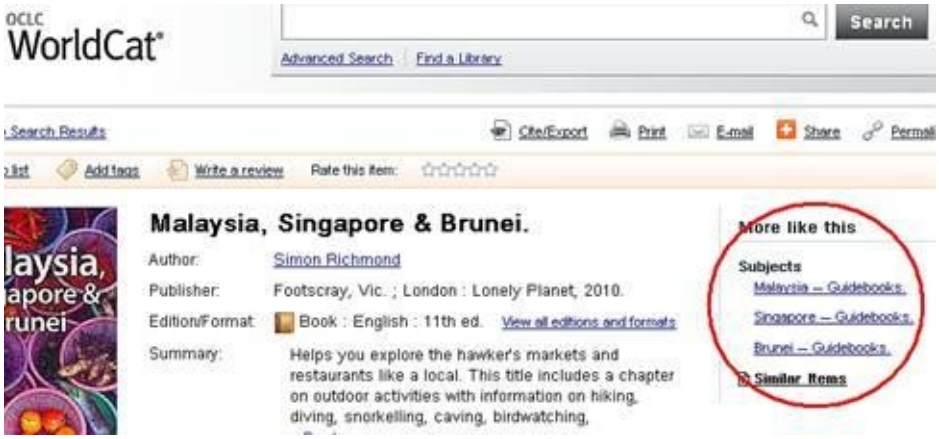
How do libraries, article databases, and corporations stay consistent with their subject headings?

Several people might be classifying books in a library or documents in a corporate document management system. How does the organization guide employees to use the same keyword/tag when they mean the same thing? The answer is: they use a *controlled vocabulary* that is predefined and expanded only by designated authorized personnel.

An individual librarian typically chooses subject headings from the controlled vocabulary when classifying books. In the U.S., most libraries use a controlled vocabulary with subject headings defined and expanded by the Library of Congress (www.loc.gov) for their books. The Library of Congress has maintained a database of the *Library of Congress Subject Headings* (LCSHs) since 1898,[52] and updates the database when new subject headings become necessary.

You can use WorldCat.org to find books, CDs, DVDs, *etc.* and their LCSHs. WorldCat.org is a website maintained by the largest cooperative of libraries worldwide, the OCLC. The OCLC has more than 25000 member libraries, museums, and archives in 170 countries. WorldCat.org can be your window into their library catalogs.[53]

As you may remember, I am taking a trip to the Malaysian part of Borneo, so I am going to look for the *Lonely Planet Malaysia, Singapore and Brunei* as a guidebook to take with me:



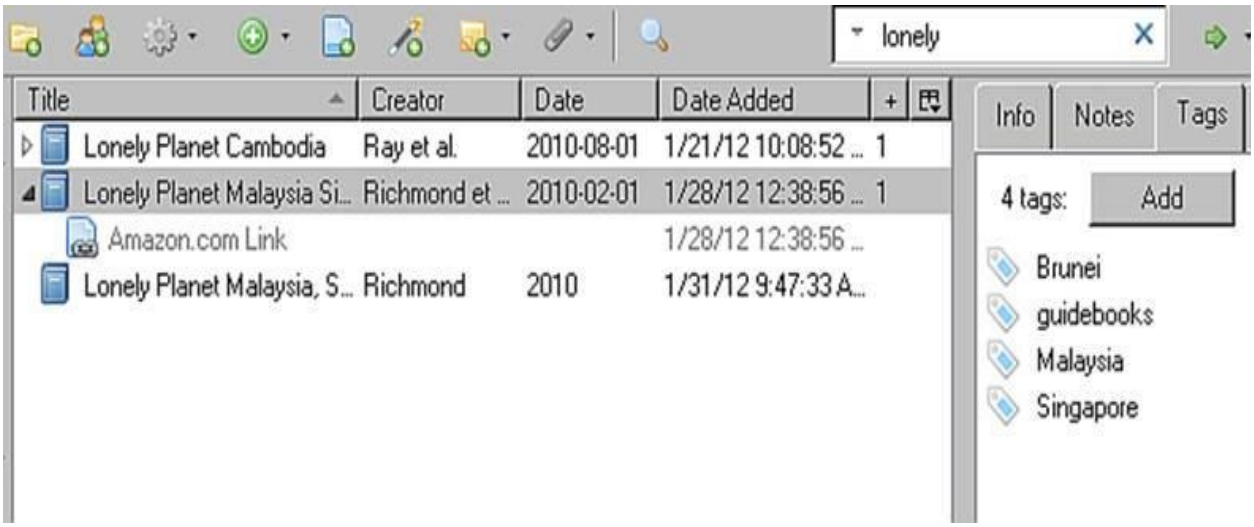
In the circle, you find the Library of Congress Subject Headings (LCSHs):

- Malaysia -- Guidebooks
- Singapore -- Guidebooks
- Brunei -- Guidebooks

Note: *Each subject heading refers to a different subject and can have subdivisions to narrow down the subject. In the LCSHs, the double hyphen --*

between Malaysia and Guidebooks tells you that Guidebooks is a subdivision within the subject Malaysia. Subdivisions can again have subdivisions…

We can now use the book's LCSHs to guide us when tagging it in Zotero:



In addition to tagging the book, I suggest that you copy the complete subject headings into the book bibliography's **Extra** field. Over time, this helps to gain a deeper understanding of how librarians use the LCSHs to classify books.

Tip: *Use Amazon.com to add a book to Zotero and WorldCat.org to find the book's LCSHs. In my experience, Amazon.com provides more complete bibliographic information than WorldCat.org for many books. For this reason, I tend to add a book to Zotero via Amazon and then search for the book in WorldCat.org to obtain its LCSHs (and tag it). However, there are cases where you cannot find a book in Amazon; in these cases, you would add the book via WorldCat.org.*

Why should you consider using the Library of Congress Subject Headings (LCSHs)?

The LCSHs are used by most libraries in the U.S. If you want to locate items (e.g., other books, journals) related to a book you are reading, or all items related to a subject, understanding how the LCSHs work can be very helpful. If you are using books published in other countries and languages, it helps tremendously to learn how books in a particular country/language are usually classified.

As an alternative (or in addition to the LCSHs), you can also consider Amazon's (or your preferred book vendor's) categories to guide your own tagging. You just have to keep in mind that different book vendors have slightly different ways to categorize books.

If you mainly use a particular book vendor as your book source, consider adding their categories to the **Extra** field, along with the LCSHs. As for the subjects used in Amazon.com, they sometimes contain the LCSHs, but Amazon often also uses additional and different subject headings. In my opinion, this is not consistent enough for tagging books, so I consult WorldCat.org for this purpose.

14.6 Consistently Tagging Web Pages, Articles, and Other Items in Zotero

Unlike books, web pages/websites cannot be located in a catalog with standardized subjects readily assigned to them. Likewise, when you do a Google Search, you are searching for keywords in the whole of a web page (which may be constantly changing), not only in a record with bibliographic information. While web pages do provide a way for website owners to directly assign subject keywords, this feature has been widely abused by marketers. Consequently, popular search engines, such as Google, Bing, and Yahoo, largely ignore these keywords.

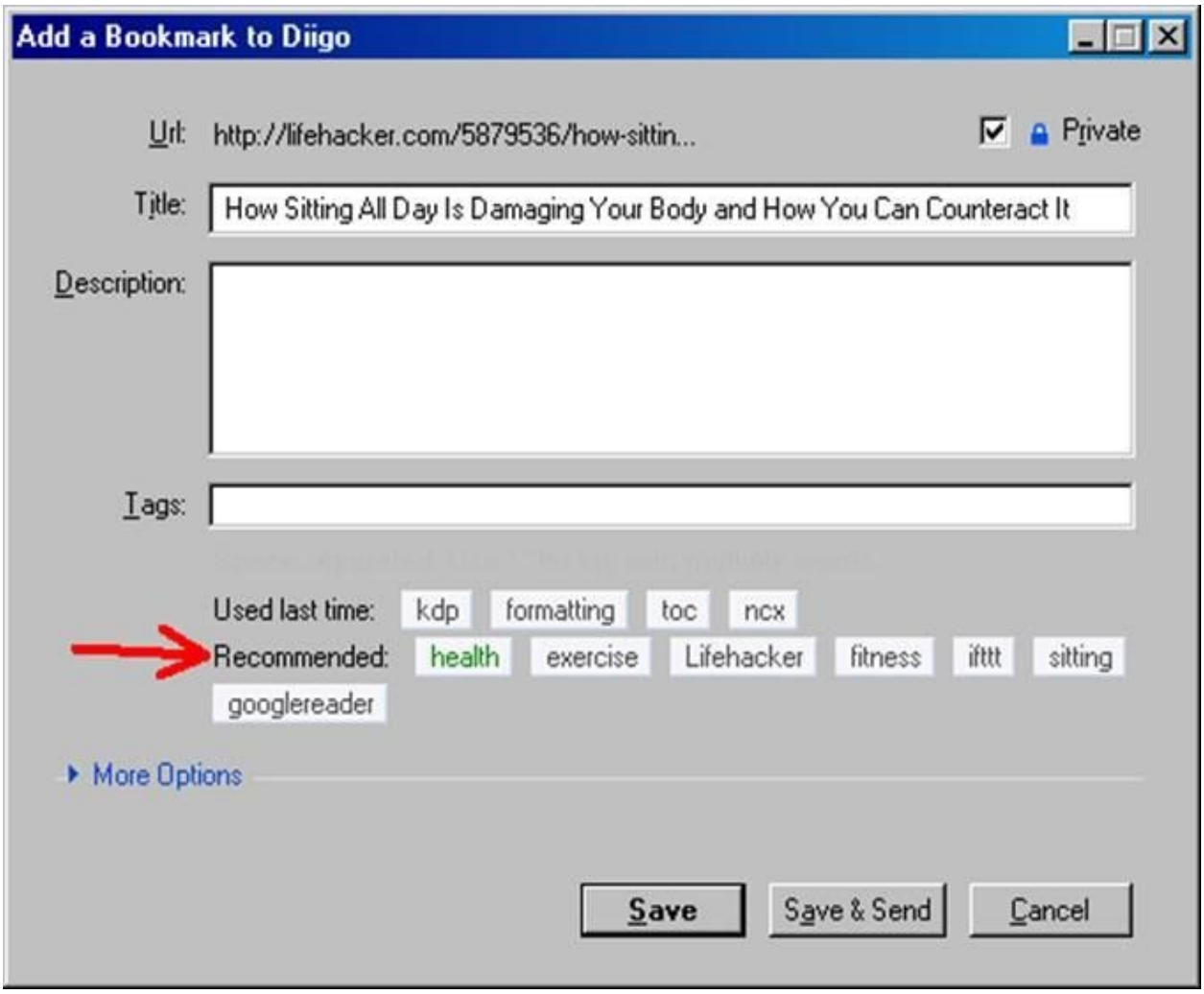
After having made yourself familiar with the LCSHs, you could try to tag web pages with keywords derived from the LCSHs. This, however, may be a bit too slow to satisfy you, and LCSHs are, in some subject areas, not detailed enough to allow you to organize web pages (you are collecting in Zotero) in an effective manner.

The way I adopt is “asking the crowd,” that is, asking the collected wisdom of people tagging web pages. You can find out which tags other people use for a web page through social bookmarking services like Diigo.com and Delicious.com.

So far, we have talked about Diigo as being a service allowing you to tag bookmarks. In addition to privately bookmarking and tagging web pages, many people use Diigo to share bookmarks and the assigned tags with the public. Diigo keeps track of all tags used by you and other people, analyzes the web page you are trying to bookmark, and offers recommended tags. This is by no means perfect, especially when trying to obtain recommended tags for web pages bookmarked by only a few people, but it gives you enough hints to keep your bookmarks consistent in Diigo and to tag the corresponding web pages in Zotero. Before I add a web page to Zotero, I check whether I have already bookmarked it in Diigo and what tags Diigo recommends.

Here is an example: I just found an interesting article related to our sedentary lifestyle and the associated health risks on the popular blog lifehacker.com, and I

want to add this article to Zotero. Trying to bookmark it in Diigo, I can see that I have not yet tagged the web page in Diigo (Tags: empty). Next, I skim the section *Recommended*, to see Diigo's suggestions. Note that the green-colored tags are the ones I have used before:



When you start typing a tag in Zotero, Zotero also makes recommendations based on tags you have used before. I compare these to the recommendations made by Diigo.

Armed with this input, I decide on the subject tags in Zotero.

An alternative in Zotero is to tag web pages only very sparingly and mainly use collections to organize them. Also, if you collect a web page only for temporary reading, you don't really have to assign subject tags.

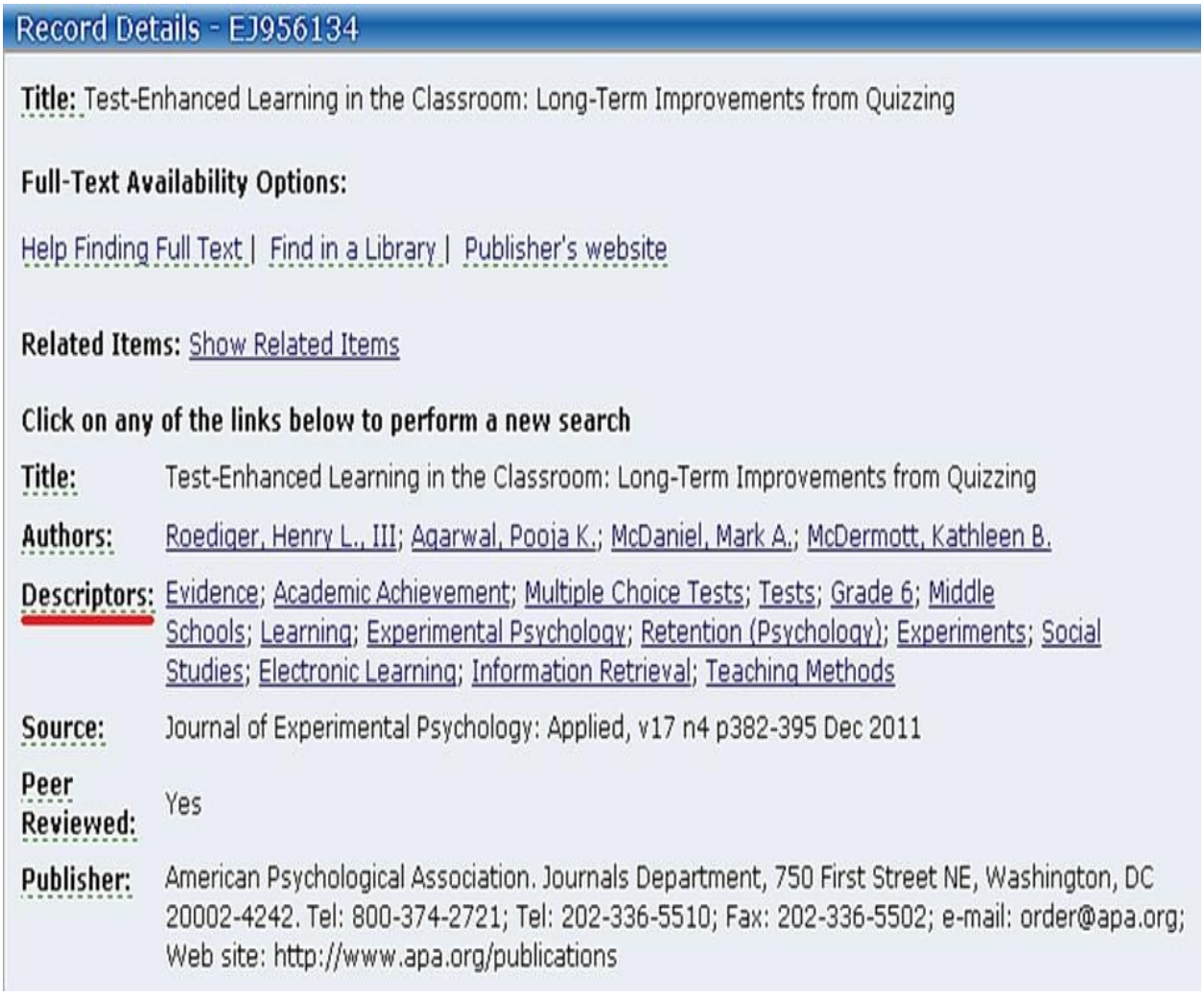
Tagging journal articles

Articles in academic journal databases have usually been assigned subject headings by experts in the field, using a specialized controlled vocabulary within the field covered by the database.

Let's look at *ERIC* (eric.ed.gov) as an example:

The Education Research Information Center (ERIC) is an online digital library sponsored by the U.S. Department of Education.[54] ERIC is a large article and abstract database and contains more than 1.4 million items (as of May 2012).[55] It uses a controlled vocabulary (the ERIC Thesaurus) to describe articles in its database.

Here is an entry found in ERIC:



Record Details - EJ956134

Title: Test-Enhanced Learning in the Classroom: Long-Term Improvements from Quizzing

Full-Text Availability Options:

Help Finding Full Text | Find in a Library | Publisher's website

Related Items: Show Related Items

Click on any of the links below to perform a new search

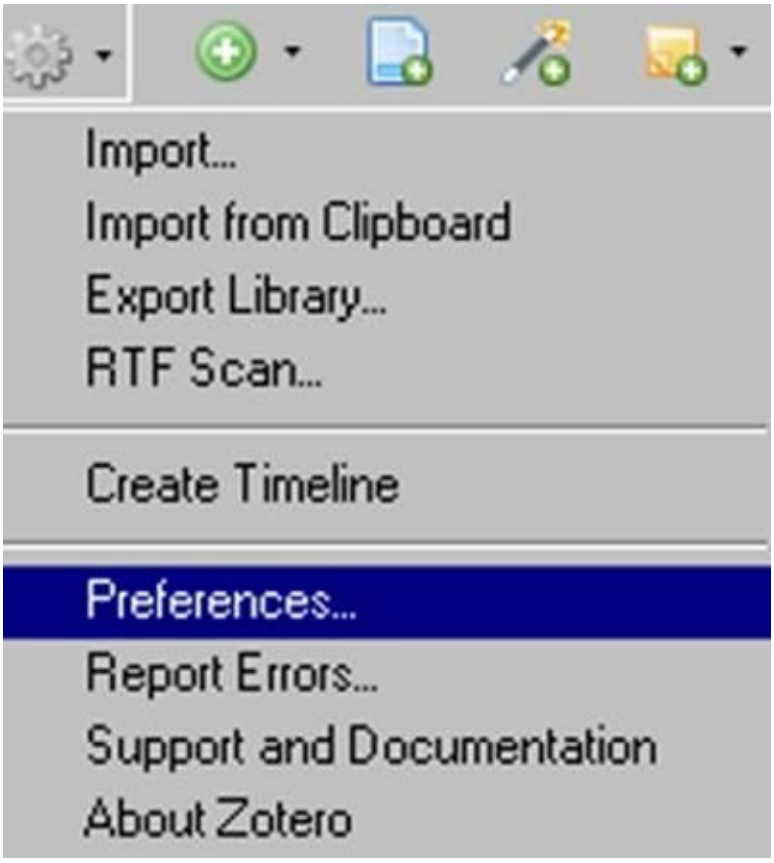
Title:	Test-Enhanced Learning in the Classroom: Long-Term Improvements from Quizzing
Authors:	Roediger, Henry L., III; Agarwal, Pooja K.; McDaniel, Mark A.; McDermott, Kathleen B.
Descriptors:	Evidence; Academic Achievement; Multiple Choice Tests; Tests; Grade 6; Middle Schools; Learning; Experimental Psychology; Retention (Psychology); Experiments; Social Studies; Electronic Learning; Information Retrieval; Teaching Methods
Source:	Journal of Experimental Psychology: Applied, v17 n4 p382-395 Dec 2011
Peer Reviewed:	Yes
Publisher:	American Psychological Association. Journals Department, 750 First Street NE, Washington, DC 20002-4242. Tel: 800-374-2721; Tel: 202-336-5510; Fax: 202-336-5502; e-mail: order@apa.org; Web site: http://www.apa.org/publications

In ERIC, the subject headings are called Descriptors.

When you add an article from a journal database such as ERIC to Zotero, I suggest you add the subjects assigned by the journal database as tags. This allows you to later find your articles according to these subjects in Zotero and, what may be even more important, provides you with subjects to search for in the journal database if you want to find additional articles.

In the case of ERIC and several other databases (but not all), the tags are even automatically assigned by Zotero. For ERIC, Zotero assigns the Descriptors as tags:

If you want to choose your tags manually, you can switch this feature off in **Preferences->General** (Miscellaneous) by disabling **Automatically tag items with keywords and subject headings**:



As an alternative, you could selectively delete subject headings from the tab **Tags**, keeping only the ones you like.

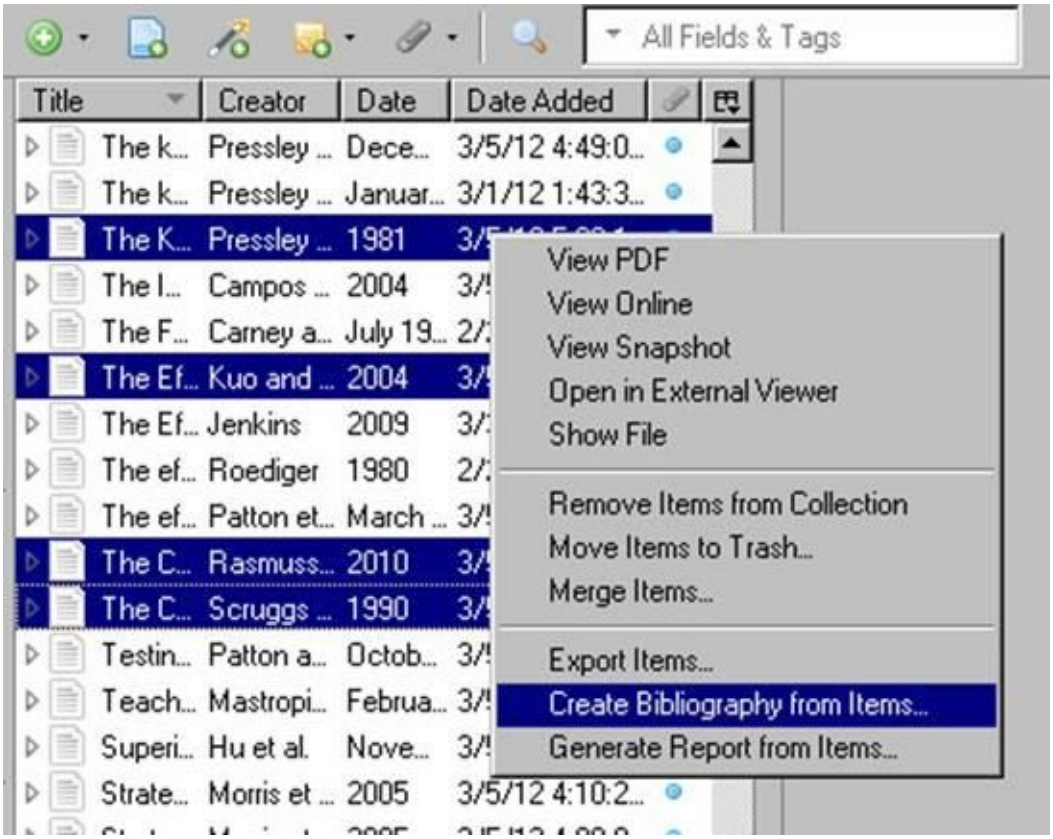
14.7 Creating Citations and Bibliographies

If you are writing a paper, blog post, or book, you likely need to cite your sources and create a bibliography. This can be a really painful and laborious process if done manually. With Zotero, you can create bibliographies and notes in all common citation styles with just a few mouse clicks, including APA, Chicago, Harvard, and MLA, to name just a few. To accomplish this, Zotero offers you two different ways:

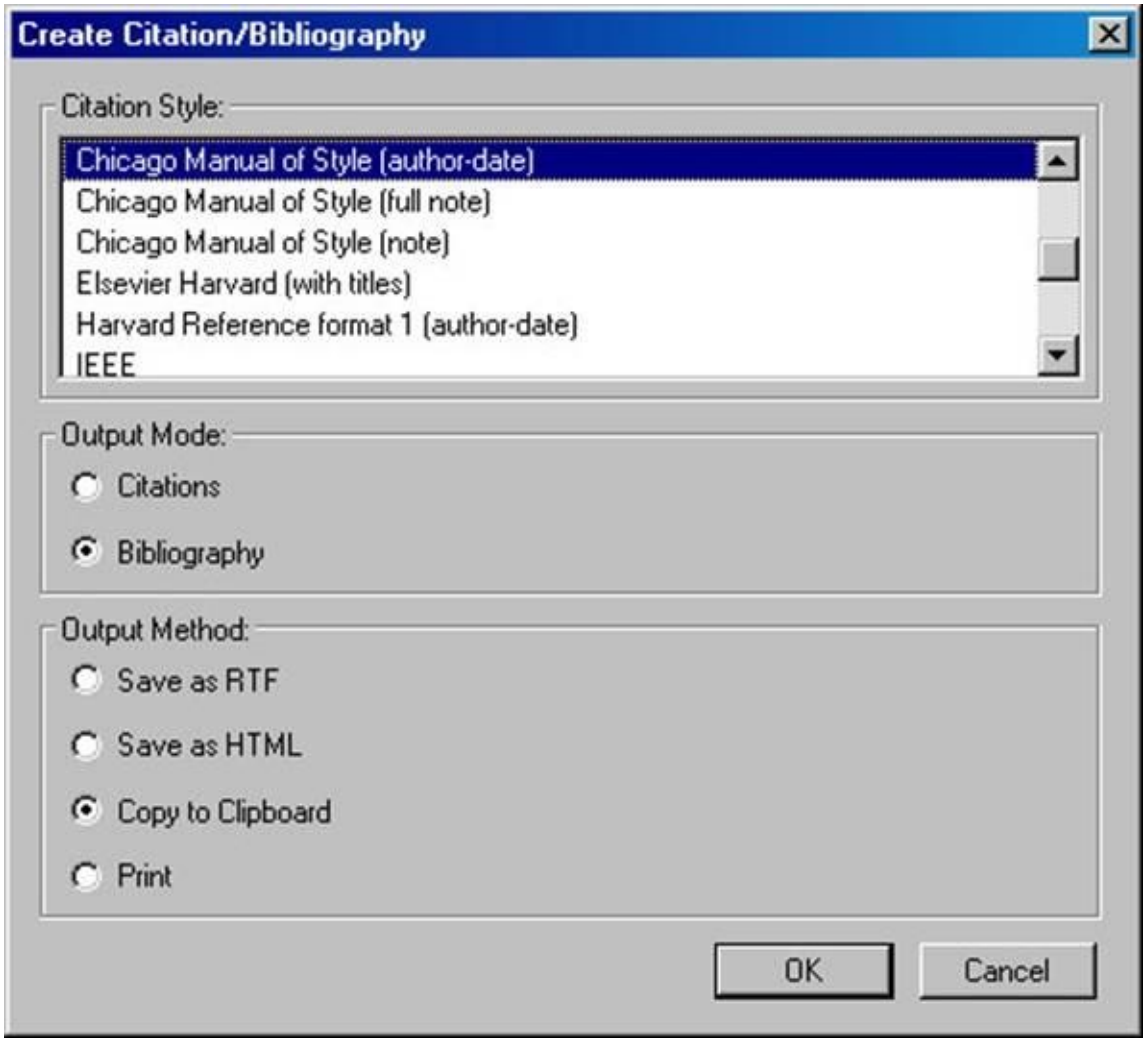
1. A Plugin for Microsoft Word and Libreoffice allows you to access your Zotero library directly from these word processors. You can insert in-text citations and automatically create and update footnotes and endnotes based on these citations. The plugin also allows you to insert a bibliography containing all works cited in many different styles. You can download the plugin directly from the Zotero website (Zotero.org).
2. If you are working with other software, such as Google Docs, or don't want to use the plugin, you can also directly create notes and bibliographies in Zotero.

Creating a bibliography is really a breeze:

1. Open Your Zotero library, and select the items for which you want to create notes or a bibliography. Next, click the right mouse-button and select **Create Bibliography from Items.**



2. Choose your preferred citation style, and decide whether you want to create notes or a bibliography. In this example, we are creating a bibliography and placing it in our computer's clipboard:



3. Paste your bibliography into your word processing program:

Kuo, Mei-Liang Amy, and Simon Hooper. 2004. "The Effects of Visual and Verbal Coding Mnemonics on Learning Chinese Characters in Computer-Based Instruction." *Educational Technology Research and Development* 52 (3): 23–38. doi:10.1007/BF02504673.¶

Pressley, Michael, Joel R. Levin, and Gloria E. Miller. 1981. "The Keyword Method and Children's Learning of Foreign Vocabulary with Abstract Meanings." *Canadian Journal of Psychology/Revue Canadienne De Psychologie* 35 (3): 283–287. doi:10.1037/h0081147.¶

Rasmussen, Martin, and Floyd W. Rudmin. 2010. "The Coming Pin Code Epidemic: A Survey Study of Memory of Numeric Security Codes." *E-Journal of Applied Psychology* 6 (2): 5–9.¶

Scruggs, Thomas E., and Margo A. Mastropieri. 1990. "The Case for Mnemonic Instruction: From Laboratory Research to Classroom Applications." *The Journal of Special Education* 24 (1): 7–32. doi:10.1177/002246699002400102.¶

Voila, you have created a bibliography in your preferred style.

14.8 Getting Started with Your Personal Information Management

We have covered a lot of information, two types of tools, and several concepts to organize information from most modern sources.

The first tool was the online bookmarking tool Diigo. With a bookmarking tool, you can organize online information, so that you can later find it again without doing another search in Google or other search engines. You are creating your own collection of online information. Your collection is available no matter where you are and from which device you access the Internet. Since Diigo is a social bookmarking tool, you can also share this information with other people on the Internet. To organize your information according to projects, subjects, and workflow steps, use tags.

I recommend you start your personal information management efforts with an online bookmarking tool like Diigo. This may be all you need to stay on top of information and manage your knowledge.

If you are doing research, need bibliographic information (e.g., for your writing) and citation management, want to organize a book collection, or intend to build a sizeable collection of information and knowledge that is available even when the original information has been removed from the Internet, I suggest you go a step further and build a personal digital library. I recommend you use Zotero for this purpose. Zotero is free, flexible, and continuously being improved. It is used by students, professionals, researchers, universities, and libraries. If you decide to build a personal digital library, I recommend you make your information management a two-step process: Use Diigo (or another bookmarking tool) to manage everyday online information. If you need an item for your research, or it becomes important enough for you to keep it, add it to your personal Zotero library.

15 Electronic Reading and In-Document Note Taking

Answering questions and taking notes help us to stay actively involved while reading, watching a video, or following a lecture or podcast.

They also aid memory because by answering questions, summarizing main ideas in your own words, and reflecting on what you take in, you connect the new information to information you already know. (Remember, our memory is associative.) In addition, good note taking helps to reduce the information to its essence to allow for later reviews.

As we have seen in earlier chapters, reviewing by practicing recall and then comparing our “recall output” to our notes is absolutely essential if we want to remember what we read, hear, or watch.

This chapter introduces techniques and tools to use your computer to effectively take and manage notes. There are a number of good tools out there, and we can’t go through all of them, but the techniques are transferable.

Depending on your preferences and the medium you use for learning, you can use in-document note taking (i.e., highlights and margin annotations), external note taking (e.g., in a note-taking software supporting mind mapping or outlining), or a combination of the former and the latter.

15.1 In-Document Highlighting and Note Taking

The two main types of in-document notes are highlights and margin annotations.

Before you highlight or annotate, read at least a complete paragraph (or better a whole page), and briefly reflect on what you have read to get the big picture:

Ask, “What is this paragraph/page/section about?”

Then highlight and annotate. You are most likely already used to annotating printed matter. You use a highlighting pen and write in the margins. Annotating electronic documents works in the same way and has the added benefit that you can search your highlights and annotations. Usually, you can also export them as a summary, which is very helpful when creating an outline, a mind map, or flash cards.

Let’s take a look at the most popular document types you are likely to encounter and the tools to annotate and export in-document annotations.

15.2 Annotating Web Pages

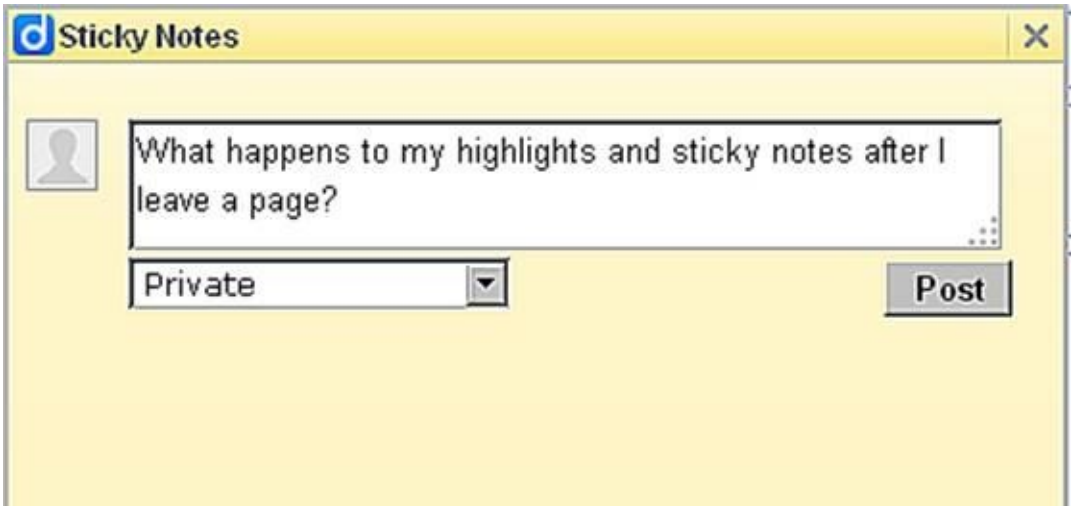
Web pages are generally not stored on your computer, but on the Internet. To highlight and annotate web pages, you can again use Diigo (the tool we used to bookmark and tag web pages). Diigo in Firefox and Internet Explorer comes with a toolbar, which looks like this:

In other web browsers, the so-called Diigolet offers similar functions:

As an example, I have searched Wikipedia for an entry on Diigo and obtained a web page. Clicking on **Highlight** changes the mouse pointer into a highlighting pen. We can now highlight parts of the page:

Diigo
pencil icon
From Wikipedia, the free encyclopedia
Diigo (pron.: /ˈdi:gou/)[1] is a social bookmarking website which allows signed-up users to bookmark and tag web-pages. Additionally, it allows users to highlight any part of a webpage and attach sticky notes to specific highlights or to a whole page. These annotations can be kept private, shared with a group within
Diigo
Diigo logo v2.png
URL http://www.diigo.com
Commercial? Yes
Type of site Social Annotations, Highlighting and Social Bookmarking
Launched July 4, 2006
Current status Active

To add a comment to a highlighted passage, move your mouse pointer into the highlighted passage, click on the appearing **pencil icon**, and choose **add sticky note**. Let's add a question related to the highlighted passage:



Click on **Post** to save the note. The callout (numbered 1) signals that there is one note related to the highlighted passage.

1
Diigo
(pron.: /'di:gou/)[1] is a social bookmarking website which allows signed-up users to bookmark and tag web-pages. Additionally, it allows users to highlight any part of a webpage and attach sticky notes to specific highlights or to a whole page. These annotations can be kept private,
Diigo
Diigo logo v2.png
URL
http://www.diigo.com
Commercial?
Yes
Type of site
Social Annotations, Highlighting and Social Bookmarking
Launched
July 4, 2006
Current status
Active

To see the note or add an additional note, just move the mouse pointer on the callout.

Note: *You can share Diigo annotations. Diigo is a social research tool allowing you to collaborate with other people. By that token, you can keep notes private or share them with a group (e.g., colleagues or classmates).*

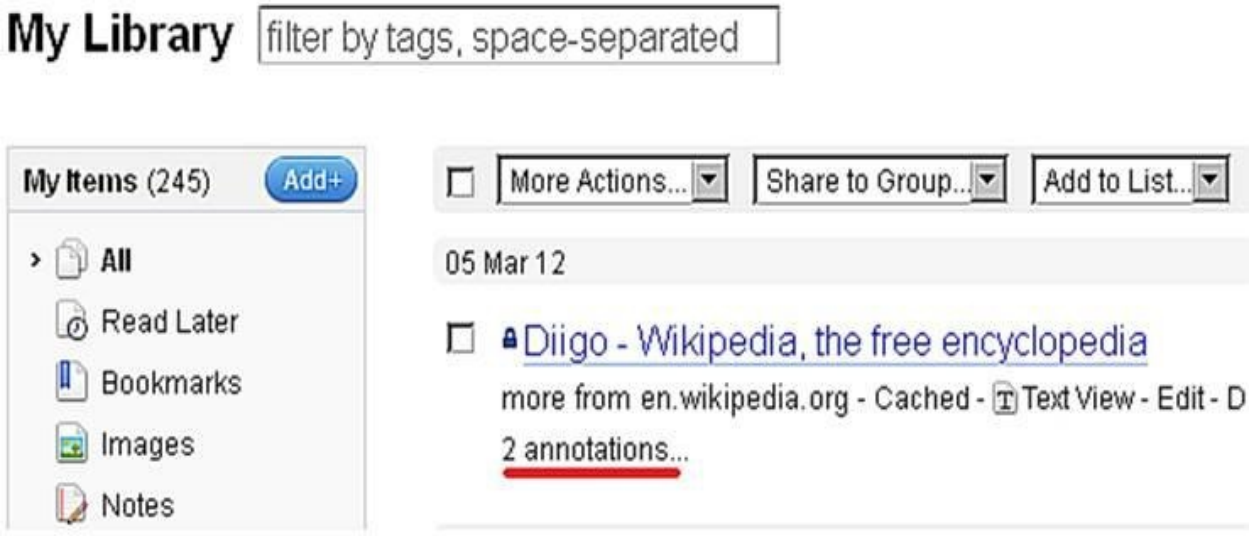
All annotations and highlights are automatically stored on the Diigo Server in *My Library*, so, provided you are logged into Diigo, whenever you return to a particular web page (no matter from where you access it), the annotations will be there waiting for you.

Apart from fixed sticky notes, which are always related to highlighted passages,

you can also add comments and floating sticky notes, which are related to the whole web page. Add them by clicking on **Comment** on the Diigo toolbar or **Sticky Note** on the Diigolet bar.

Exporting your annotations from Diigo

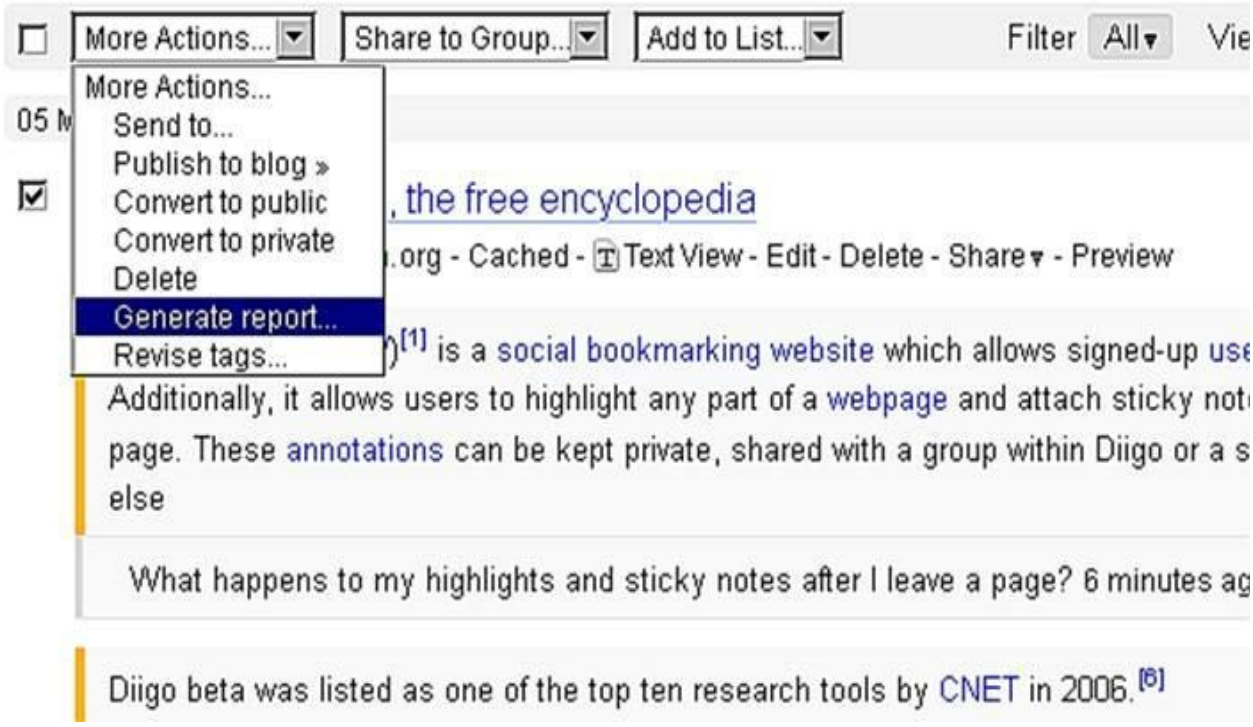
You can export your highlights and notes from Diigo and copy them into a Word document or manage them together with an offline copy of the web page in Zotero. All your web annotations are initially stored (together with a bookmark for the annotated web page) in *My Library.* Click on **Diigo** on the toolbar, and select **My Library** to open it:



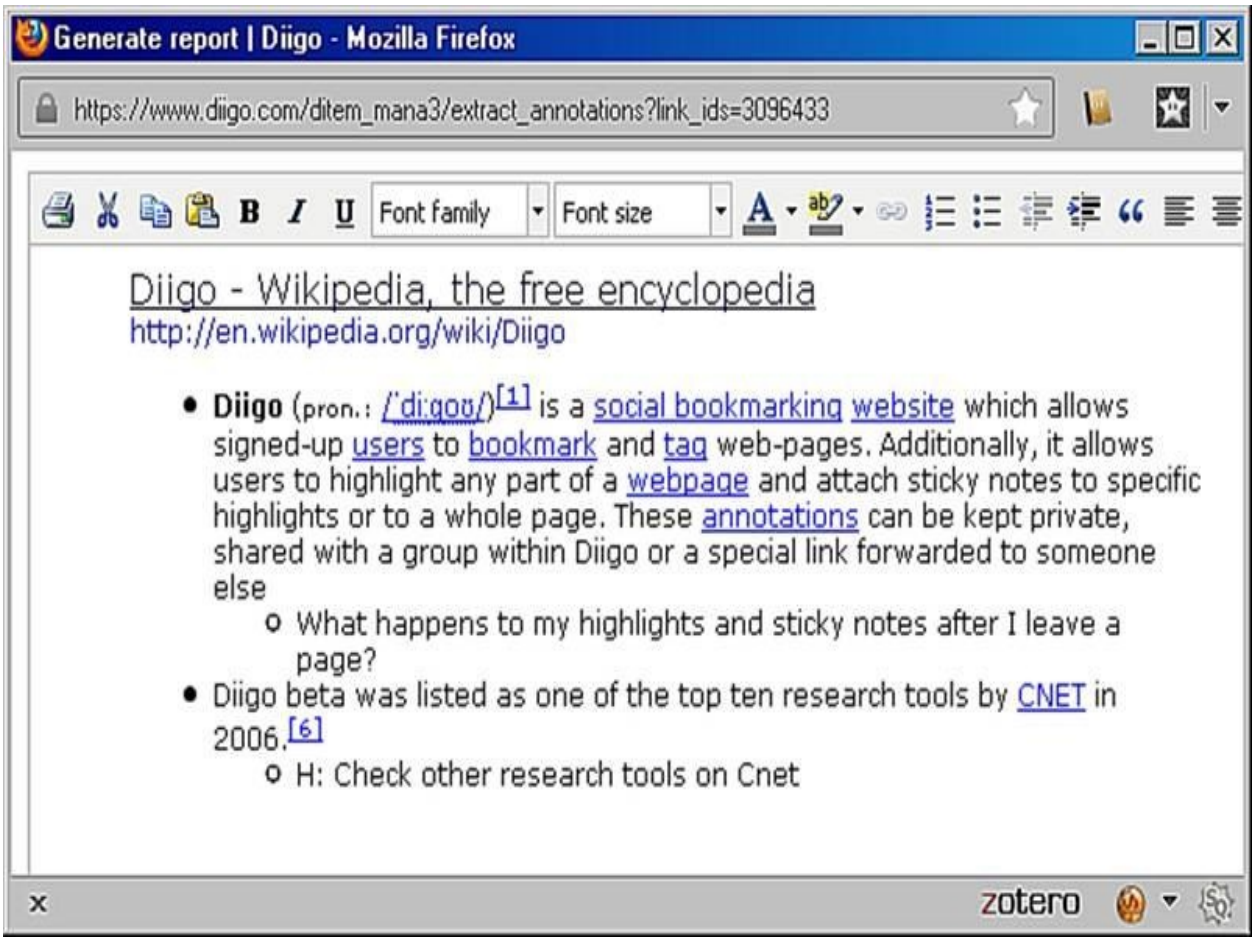
In My Library, the Wikipedia entry for Diigo has two annotations. Click on **annotations** to see them:

Diigo - Wikipedia, the free encyclopedia
more from en.wikipedia.org - Cached - Text View - Edit - Delete - Share - Preview
Diigo (pron.: /'di:gou/)[1] is a social bookmarking website which allows signed-up users to
Additionally, it allows users to highlight any part of a webpage and attach sticky notes to
page. These annotations can be kept private, shared with a group within Diigo or a specia
else
What happens to my highlights and sticky notes after I leave a page? 6 minutes ago - R
Diigo beta was listed as one of the top ten research tools by CNET in 2006.[6]
H: Check other research tools on Cnet on 2012-03-05 - Remove

To export your annotations, select **View->Advanced**, tick one or more entries, and choose **More Actions->Generate report**:


More Actions...
Share to Group...
Add to List...
Filter
All
More Actions...
Send to...
Publish to blog »
Convert to public
Convert to private
Delete
Generate report...
Revise tags...
the free encyclopedia
.org - Cached - Text View - Edit - Delete - Share - Preview
[1] is a social bookmarking website which allows signed-up use
Additionally, it allows users to highlight any part of a webpage and attach sticky not
page. These annotations can be kept private, shared with a group within Diigo or a s
else
What happens to my highlights and sticky notes after I leave a page? 6 minutes ag
Diigo beta was listed as one of the top ten research tools by CNET in 2006.[6]

This opens a new window, from which you can copy all annotations for the selected web pages:


Generate report | Diigo - Mozilla Firefox
https://www.diigo.com/ditem_mana3/extract_annotations?link_ids=3096433
Font family
Font size
Diigo - Wikipedia, the free encyclopedia
http://en.wikipedia.org/wiki/Diigo
Diigo (pron.: /'di:gou/)[1] is a social bookmarking website which allows signed-up users to bookmark and tag web-pages. Additionally, it allows users to highlight any part of a webpage and attach sticky notes to specific highlights or to a whole page. These annotations can be kept private, shared with a group within Diigo or a special link forwarded to someone else
What happens to my highlights and sticky notes after I leave a page?
Diigo beta was listed as one of the top ten research tools by CNET in 2006.[6]
H: Check other research tools on Cnet
zotero

You can choose as many web pages from which to export annotations as you like before generating a report. Thus, with one click you can export the annotations of several web pages into a single document.

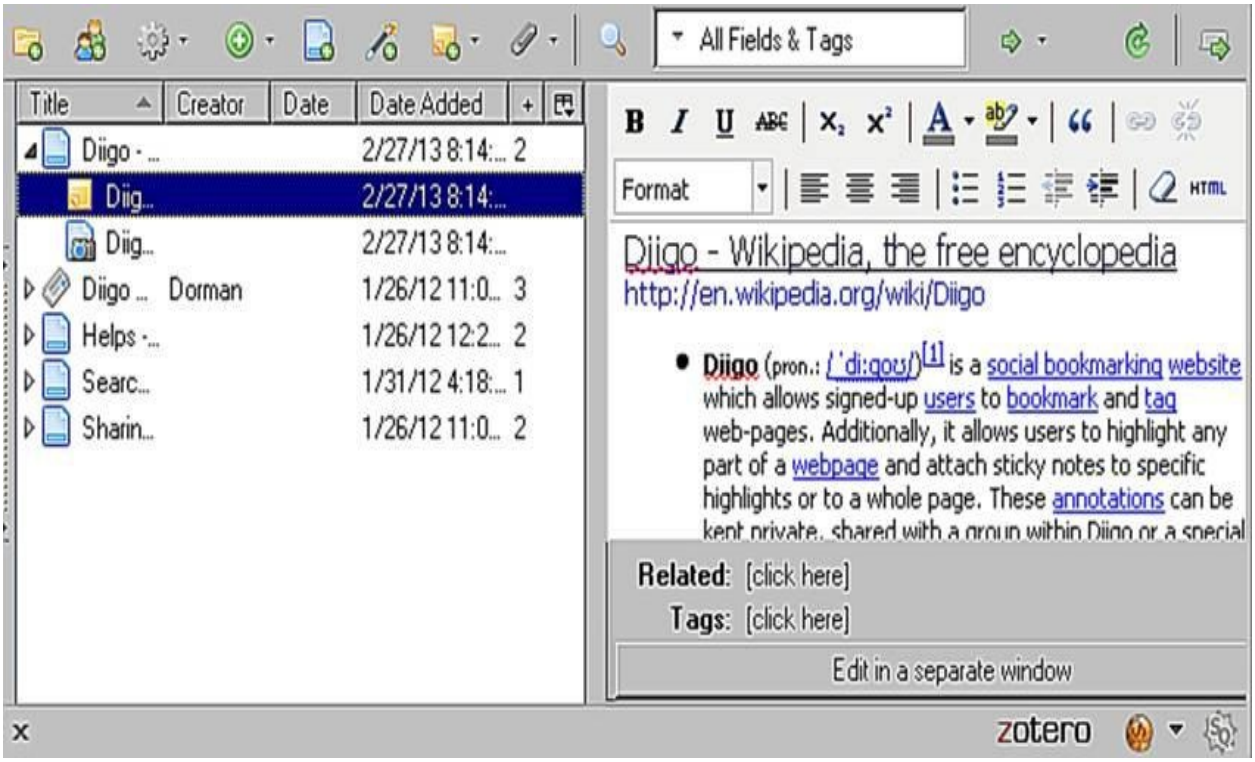
This is very useful when reading a discussion thread on a forum website, which may span several web pages (sometimes 10 or more). Just follow the discussion and highlight everything interesting. Then move on to the next page and so on. All highlights and remarks are available in My Library. Export all highlights into a single document by **ticking** all web pages you want to include and selecting **More Actions->Generate report**.

Managing your web page notes

Diigo manages your notes and highlights in My Library, together with the web page you have annotated. If you want, just keep your notes there. Click on a web

page's bookmark, and all your annotations will come back (provided you are connected to the Internet). You can, of course, also copy your notes into a Word document, or store them in Zotero (together with an offline copy of the web page or as a stand-alone note).

In the following example, I have saved a snapshot of Diigo's Wikipedia entry to Zotero and added the exported annotations as a note:



Note: *To add a note to an item in Zotero, choose the tab "Notes" and click "Add."* Then paste the note into the provided notes window.

Now you have a searchable offline copy of the web page and all related notes in Zotero.

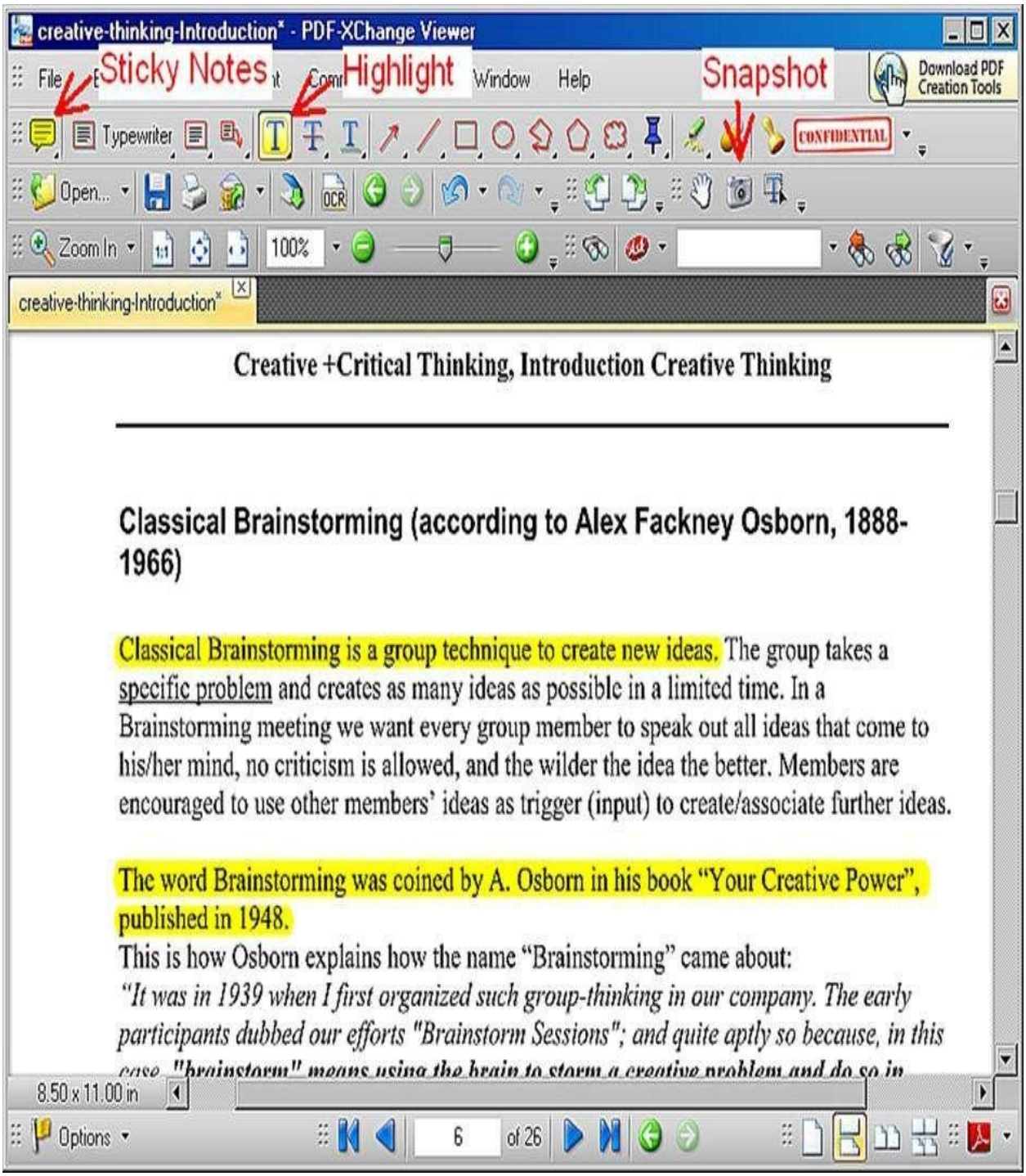
15.3 Annotating PDF Documents and E-books

Apart from the standard web page, the portable document format (PDF) is the most widely used document format on the Internet.

PDF, originally created by Adobe Systems, is now an open standard. Many e-books, journal and magazine articles, and reports are being distributed as PDF documents. Consequently, a multitude of free and commercial reading applications is available for almost every PC, phone, and tablet platform.

As a reader, you want to look for a software application that allows highlighting, adding notes related to highlights, adding margin notes, and exporting of highlights and notes.

In the following, I use the free version of PDF-XChange Viewer by Tracker Software Products (www.tracker-software.com) to illustrate PDF document annotations. You can, of course, use any PDF Reader you like; just make sure it supports highlighting, annotating, and exporting. *(For more suggestions and web links, please check remembereverything.org/book-resources.)*


creative-thinking-Introduction* - PDF-XChange Viewer
Sticky Notes
Highlight
Snapshot
Download PDF Creation Tools
Typewriter
CONFIDENTIAL
Open...
Zoom In
100%
creative-thinking-Introduction*
Creative +Critical Thinking, Introduction Creative Thinking
Classical Brainstorming (according to Alex Fackney Osborn, 1888-1966)
Classical Brainstorming is a group technique to create new ideas. The group takes a specific problem and creates as many ideas as possible in a limited time. In a Brainstorming meeting we want every group member to speak out all ideas that come to his/her mind, no criticism is allowed, and the wilder the idea the better. Members are encouraged to use other members' ideas as trigger (input) to create/associate further ideas.
The word Brainstorming was coined by A. Osborn in his book "Your Creative Power", published in 1948.
This is how Osborn explains how the name "Brainstorming" came about:
"It was in 1939 when I first organized such group-thinking in our company. The early participants dubbed our efforts "Brainstorm Sessions"; and quite aptly so because, in this
8.50 x 11.00 in
Options
6
of 26

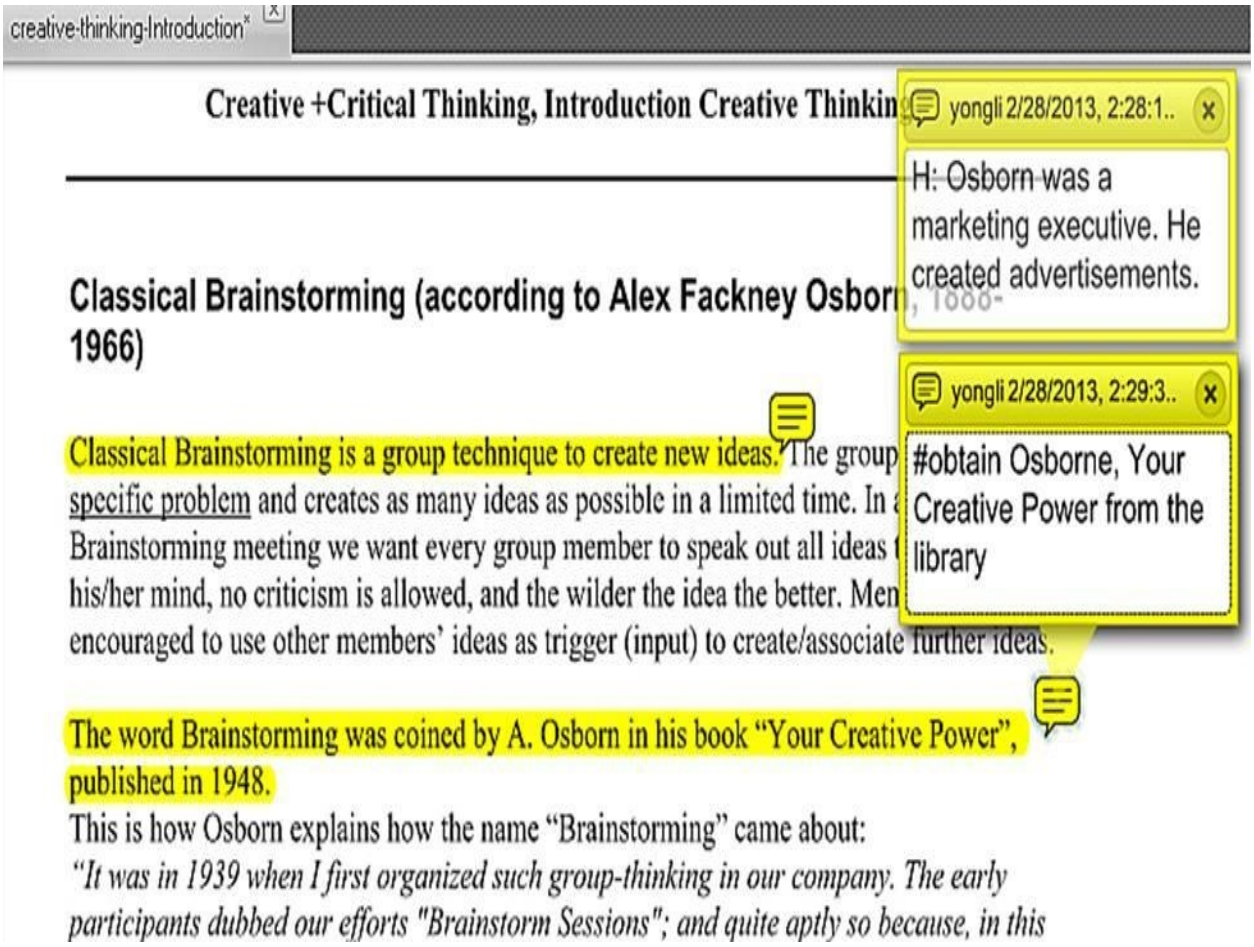
In PDF-XChange Viewer, click on **Highlight** to highlight important text passages.

Important: *Most PDF readers do not automatically include highlighted passages in exported note summaries. In PDF-XChange Viewer, you can turn this feature on by selecting* ***View->Customize UserInterface****. Under the category*

***Commenting**, tick **Copy selected text into Highlight**...*

Making Comments Options
Copy encircled text into Drawing comment pop-ups
Copy selected text into Highlight, Cross-Out, and Underline comment pop-ups

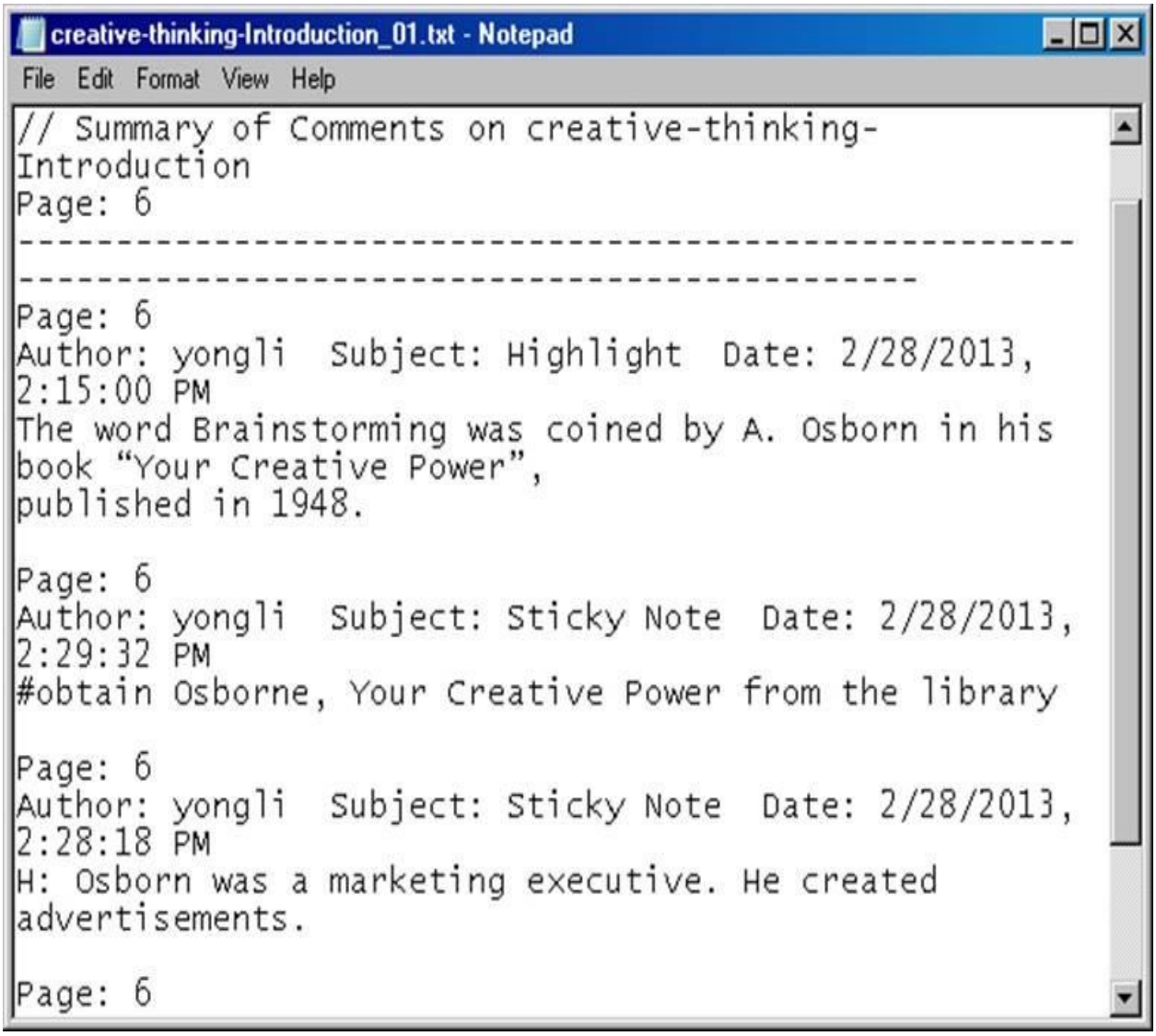
To add a sticky note, select **Sticky Notes,** click anywhere on the page, and type your note:


creative-thinking-Introduction
Creative +Critical Thinking, Introduction Creative Thinkin
yongli 2/28/2013, 2:28:1..
H: Osborn was a marketing executive. He created advertisements.
Classical Brainstorming (according to Alex Fackney Osborn
1966)
yongli 2/28/2013, 2:29:3..
#obtain Osborne, Your Creative Power from the library
Classical Brainstorming is a group technique to create new ideas. The group
specific problem and creates as many ideas as possible in a limited time. In
Brainstorming meeting we want every group member to speak out all ideas
his/her mind, no criticism is allowed, and the wilder the idea the better. Men
encouraged to use other members' ideas as trigger (input) to create/associate further ideas.
The word Brainstorming was coined by A. Osborn in his book "Your Creative Power", published in 1948.
This is how Osborn explains how the name "Brainstorming" came about:
"It was in 1939 when I first organized such group-thinking in our company. The early participants dubbed our efforts "Brainstorm Sessions"; and quite aptly so because, in this

You can save all notes and highlights directly in the PDF document by selecting **File->Save**. This is extremely useful if you manage your documents in Zotero. Your document, together with all annotations, continues to be stored in your Zotero library. However, this modifies your original e-book or journal article. If you want to preserve your original document, choose **File->Save As…**

Exporting your annotations

If you want to use your notes and highlights in other documents or add them as attached notes to a document in Zotero (see the previous section for details [15.2]), choose **Comments->Summarize Comments** – ignore warning messages encouraging you to purchase a Pro version – and export the comments as either a text or a rich text document:


creative-thinking-Introduction_01.txt - Notepad
File Edit Format View Help
// Summary of Comments on creative-thinking-Introduction
Page: 6
Page: 6
Author: yongli Subject: Highlight Date: 2/28/2013, 2:15:00 PM
The word Brainstorming was coined by A. Osborn in his book "Your Creative Power", published in 1948.
Page: 6
Author: yongli Subject: Sticky Note Date: 2/28/2013, 2:29:32 PM
#obtain Osborne, Your Creative Power from the library
Page: 6
Author: yongli Subject: Sticky Note Date: 2/28/2013, 2:28:18 PM
H: Osborn was a marketing executive. He created advertisements.
Page: 6

Managing your annotations

Exported annotations can again be used in a Word document or in Zotero, either together with the PDF document or as a stand-alone note. Please see "Annotating Web Pages" (15.2) for details.

Capturing figures and tables

To capture figures, tables, and just about any type of image from a PDF document, take a snapshot with the camera function. Select **Snapshot** *(see PDF-XChange Viewer Screenshot)* and choose the area you want to capture. The resulting image is being copied to your computer’s clipboard.

15.4 Annotating Kindle Books

In November 2007, Amazon.com launched an e-book reading device called *Kindle*.[56] The traditional Kindle – not including the Kindle Fire, which is a table computer – uses an e-ink display that mimics the reading experience of a normal book. The Kindle's display can be read anywhere you can read a normal book, including in bright sunlight. Unlike PCs, tablets, and smartphones, it doesn't need a backlight; it is much easier on the eyes and consumes a lot less power than a normal notebook or tablet computer. On Amazon.com, the Kindle has become the bestselling item, and Kindle books are already outselling hardcover and paperback books combined.

In 2009, Amazon started releasing the Kindle Reading App (Kindle App), which allows reading Kindle books on normal computers. The Kindle app is free and available for Windows (8, 7, Vista, and XP), Mac, iPad, iPhone, Android, Blackberry, and Windows Phone.[57]

Finally, in August 2011, Amazon released the Kindle Cloud Reader, allowing you to read your Kindle books directly in your web browser. The Kindle is thus now available everywhere, as a stand-alone reading device, as a software (app) for your device, and directly in your web browser. Consequently, in the following, the term *Kindle* refers to all of them, the Kindle reading device, the Kindle App, and the Kindle Cloud Reader.

All Kindle books you have purchased are stored in your Kindle account on Amazon.com. From there, they can automatically be delivered to other Kindles you have registered in your account. Most books can be on up to six Kindles simultaneously.[58] Thus, you can read the same book on the beach using your Kindle, at home on your PC, and in a coffee shop on your iPhone or iPad.

You can annotate your books, that is, you can highlight and take margin notes. In addition to your Kindle books, your highlights and notes are also automatically stored in your Kindle account on Amazon.com. Using this account, they can be synchronized with your other Kindles or exported as text.

Popular highlights

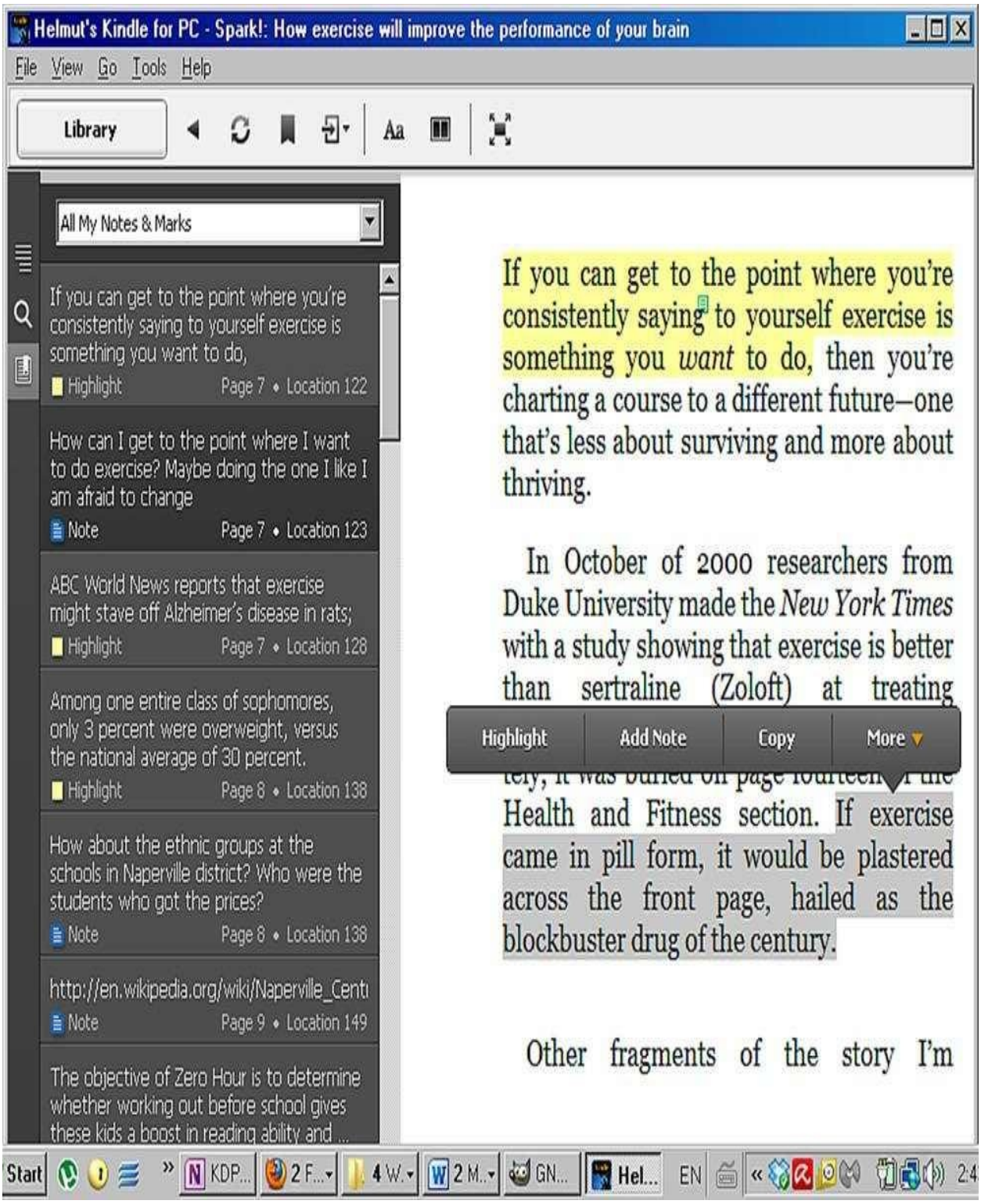
On Amazon’s website, you can see which text passages other readers have highlighted in a particular Kindle book. Amazon also publishes anonymized hit lists of the most highlighted books and popular highlights. These lists are quite interesting to browse as they give you a very good insight into what other people deem important and what is currently trending.

Sharing notes and highlights

The latest version of the Kindle also allows sharing notes and highlights with the world. This feature is called *Public Notes*, and you have to explicitly turn it on for a book if you want other people to see your annotations.[59] In this case, the annotations **contain your name**, and other people can follow your reading as they follow a blog or a person on Twitter.

Highlighting and taking notes in Kindle

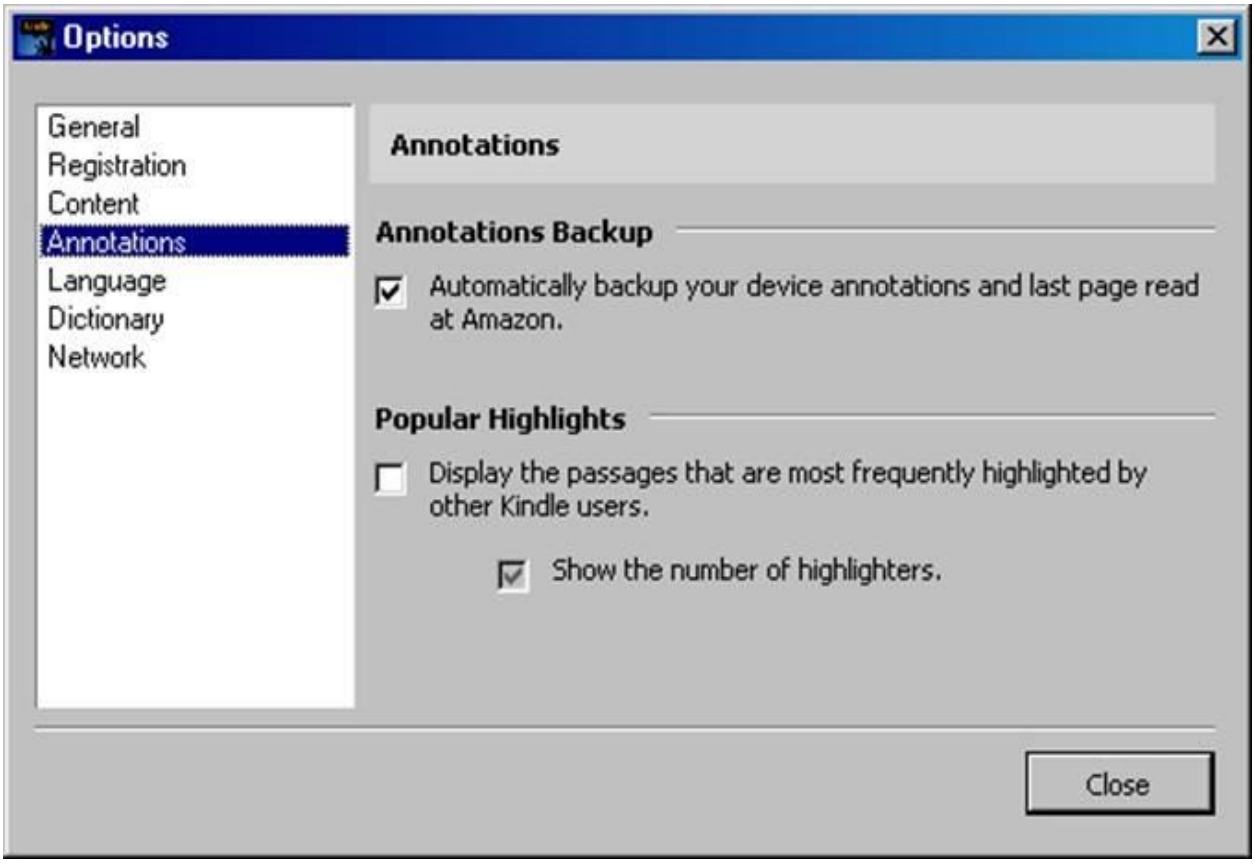
In the Kindle App for PC, for example, you mark up a passage of text by selecting it and choosing **Highlight**. You can also select **Add Note** and add your own remarks:


Helmut's Kindle for PC - Spark!: How exercise will improve the performance of your brain
File View Go Tools Help
Library
Aa
All My Notes & Marks
If you can get to the point where you're consistently saying to yourself exercise is something you want to do,
Highlight Page 7 • Location 122
How can I get to the point where I want to do exercise? Maybe doing the one I like I am afraid to change
Note Page 7 • Location 123
ABC World News reports that exercise might stave off Alzheimer's disease in rats;
Highlight Page 7 • Location 128
Among one entire class of sophomores, only 3 percent were overweight, versus the national average of 30 percent.
Highlight Page 8 • Location 138
How about the ethnic groups at the schools in Naperville district? Who were the students who got the prices?
Note Page 8 • Location 138
http://en.wikipedia.org/wiki/Naperville_Centr
Note Page 9 • Location 149
The objective of Zero Hour is to determine whether working out before school gives these kids a boost in reading ability and ...
If you can get to the point where you're consistently saying to yourself exercise is something you want to do, then you're charting a course to a different future—one that's less about surviving and more about thriving.
In October of 2000 researchers from Duke University made the New York Times with a study showing that exercise is better than sertraline (Zoloft) at treating
Highlight
Add Note
Copy
More
Health and Fitness section. If exercise came in pill form, it would be plastered across the front page, hailed as the blockbuster drug of the century.
Other fragments of the story I'm
Start
KDP...
2 F...
4 W...
2 M...
GN...
Hel...
EN

The left pane shows all the highlights and notes I have created in the currently opened book. These highlights and notes, together with the current reading position, are automatically backed up to my Kindle account on Amazon.com. If,

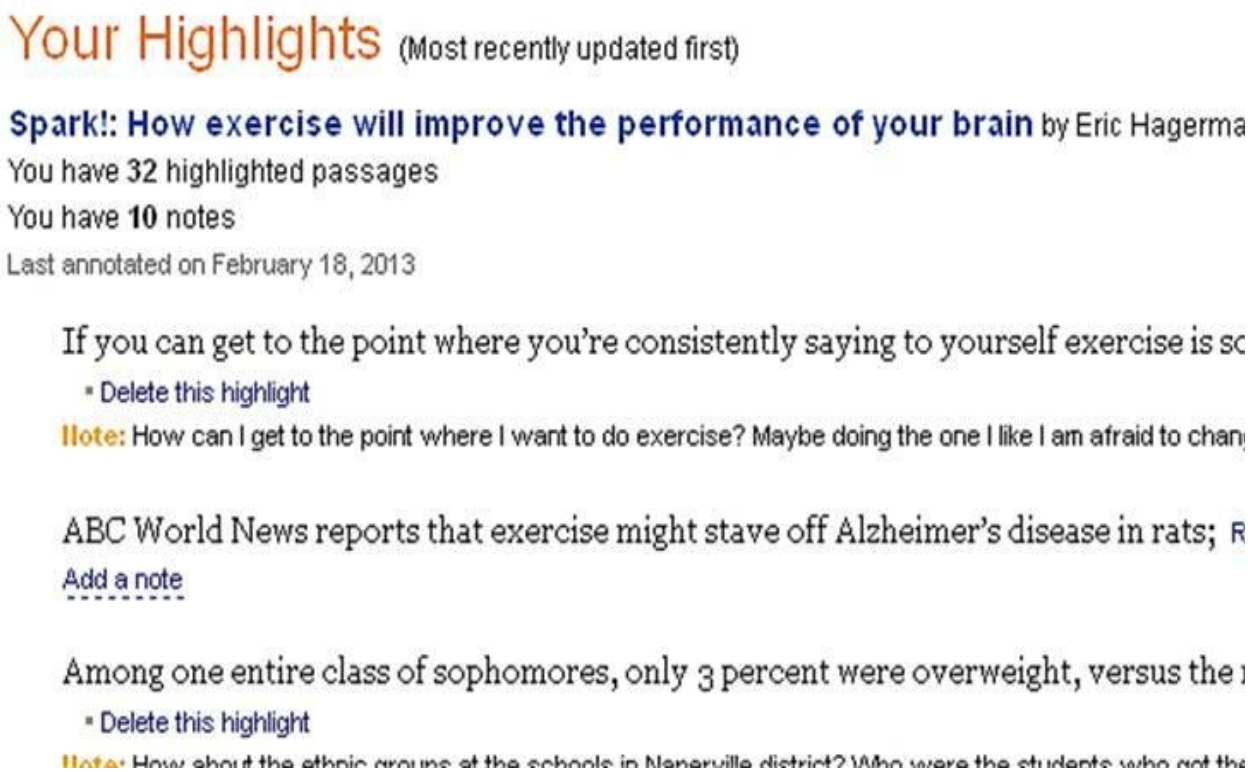
at a later point, I decide to use my Kindle reading device or iPad to continue reading, I am taken exactly to the same position. All my annotations are also available.

Note: *Whether annotations should be backed up to your Kindle account can be controlled under* ***Tools->Options****. You can also decide to display popular highlights created by other people.*



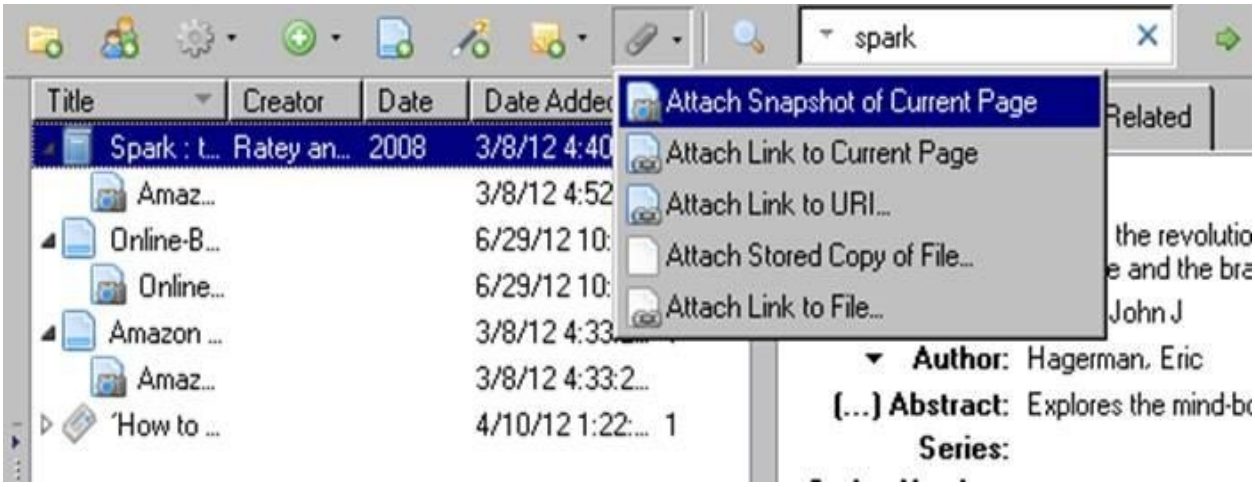
Exporting and managing annotations

All highlights and notes for all books in your Kindle library are available in your Kindle account on the website http://kindle.amazon.com. After logging in with your email address and password, you can see the annotations for all your books under **Your Highlights**.


Your Highlights (Most recently updated first)
Spark!: How exercise will improve the performance of your brain by Eric Hagerma
You have 32 highlighted passages
You have 10 notes
Last annotated on February 18, 2013
If you can get to the point where you're consistently saying to yourself exercise is sc
Delete this highlight
Note: How can I get to the point where I want to do exercise? Maybe doing the one I like I am afraid to chan
ABC World News reports that exercise might stave off Alzheimer's disease in rats; R
Add a note
Among one entire class of sophomores, only 3 percent were overweight, versus the
Delete this highlight

To see the highlights for a particular book, click on the book title. Then click on **you have xx highlighted passages**.

If you are managing your notes in Zotero, you could now save a snapshot of this web page in Zotero: First, find the book on Amazon.com, and save its bibliographic entry in Zotero. Second, attach a snapshot with your notes to the book entry. To accomplish this, select the book entry, click the **clip**, and choose **Attach Snapshot of Current Page**:



This way, your annotations stay together with the bibliographic entry of the book.

Of course, you can also select and copy all highlights and notes from the web page and paste them into a Word document or add them as a note to Zotero.

16 External Note Taking and Outlining

In many cases, it is not possible or not desirable to take electronic notes directly in a document. This includes notes of lectures, meetings, videos, paper-based books, and articles.

As an alternative to highlighting and annotating large Kindle or PDF e-books and then exporting the notes, I create mind maps or outline summaries in an external note-taking application. Outlines and mind maps allow you to condense a lot of information into a few structured pages, and they make it very easy to actively review information and keep track of what you already know.

Options to use your computer to take notes include:

- Mind-mapping software such as Freeplane (for details see the chapter on mind mapping)
- Specialized note-taking software with a full-fledged outliner such as Microsoft OneNote
- Evernote, a note-taking software, which is available for all major computer, tablet, and phone systems – great for shorter notes, information capturing on multiple devices, and note synchronization
- The note-taking function in Zotero – good for shorter notes
- Word processing software such as Microsoft Word or Openoffice

I use all of the above-mentioned software applications. Depending on your preference and computer type, different applications may be more useful. However, the techniques, such as outlining and mind mapping, should be transferable.

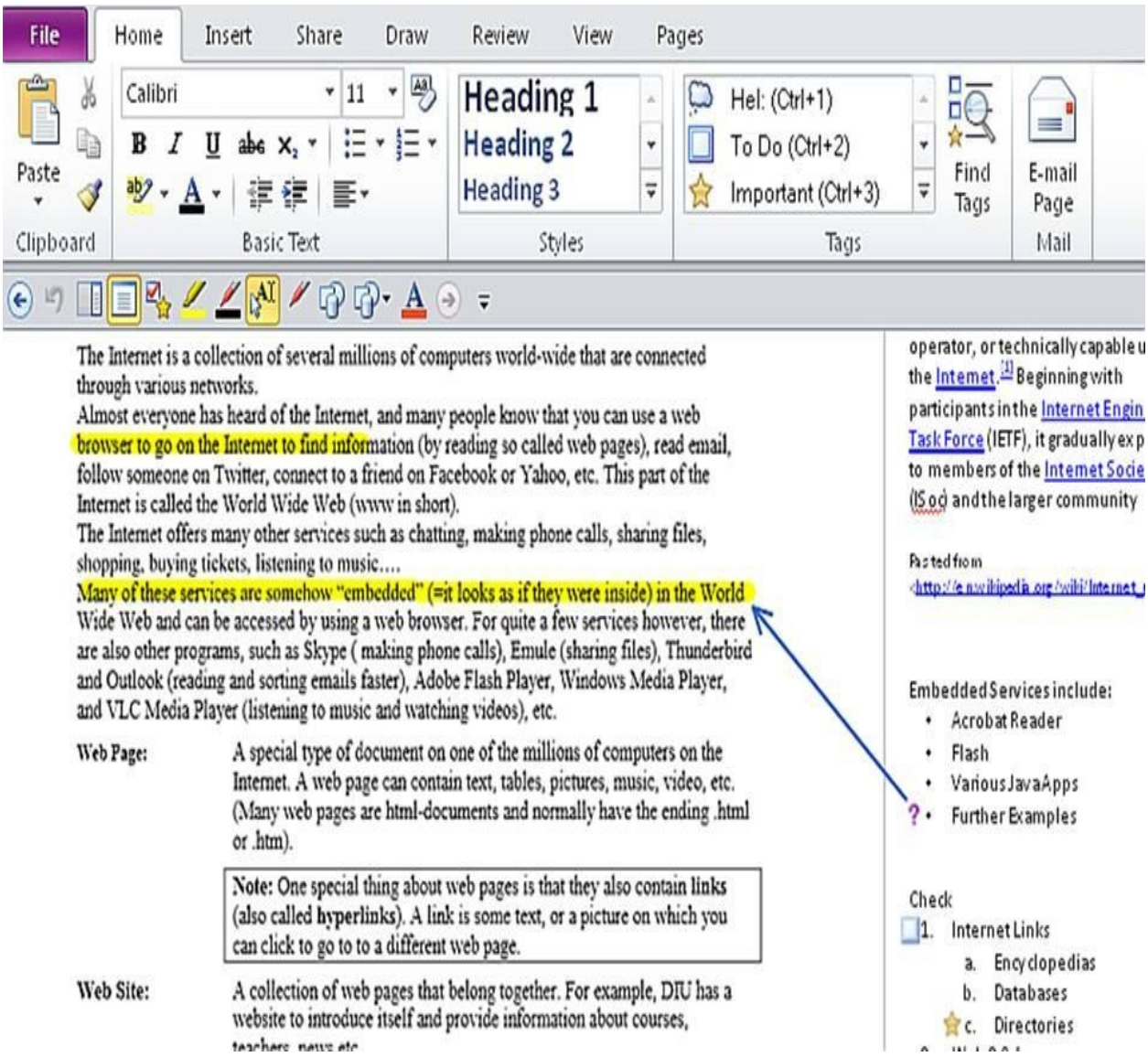
16.1 Note Taking and Outlining with OneNote

OneNote is part of Microsoft's Office suite and an extremely versatile note-taking application, allowing you to include text, tables, formulas (OneNote 2010), images, and audio and video recordings in your notes. OneNote supports many different note-taking styles.

You take your notes on pages in a OneNote notebook – and your notes can be anywhere on a page (as on a sheet of paper). The pages in your notebook can be organized in section groups and sections. You can tag items (sentences, images, paragraphs, etc.) in your notes to label them as questions, comments, to-do items, ideas, *etc.*

Two popular ways to take notes in OneNote:

1. Cut and paste, print, scan, or photograph almost any document to OneNote, and then highlight it and take margin notes (or notes anywhere else in the document).
2. Use OneNote as a folding outlining application (outliner) and create collapsible hierarchical summaries.


File
Home
Insert
Share
Draw
Review
View
Pages
Calibri
11
Heading 1
Heading 2
Heading 3
Hel: (Ctrl+1)
To Do (Ctrl+2)
Important (Ctrl+3)
Find Tags
E-mail Page
Paste
Clipboard
Basic Text
Styles
Tags
Mail
The Internet is a collection of several millions of computers world-wide that are connected through various networks.
Almost everyone has heard of the Internet, and many people know that you can use a web browser to go on the Internet to find information (by reading so called web pages), read email, follow someone on Twitter, connect to a friend on Facebook or Yahoo, etc. This part of the Internet is called the World Wide Web (www in short).
The Internet offers many other services such as chatting, making phone calls, sharing files, shopping, buying tickets, listening to music....
Many of these services are somehow "embedded" (=it looks as if they were inside) in the World Wide Web and can be accessed by using a web browser. For quite a few services however, there are also other programs, such as Skype (making phone calls), Emule (sharing files), Thunderbird and Outlook (reading and sorting emails faster), Adobe Flash Player, Windows Media Player, and VLC Media Player (listening to music and watching videos), etc.
Web Page:
A special type of document on one of the millions of computers on the Internet. A web page can contain text, tables, pictures, music, video, etc. (Many web pages are html-documents and normally have the ending .html or .htm).
Note: One special thing about web pages is that they also contain links (also called hyperlinks). A link is some text, or a picture on which you can click to go to to a different web page.
Web Site:
A collection of web pages that belong together. For example, DIU has a website to introduce itself and provide information about courses,
operator, or technically capable u
the Internet.
Beginning with
participants in the Internet Engin
Task Force (IETF), it gradually exp
to members of the Internet Socie
(ISoc) and the larger community
Pasted from
Embedded Services include:
Acrobat Reader
Flash
Various Java Apps
Further Examples
Check
1. Internet Links
a. Encyclopedias
b. Databases
c. Directories

(Printed document highlighted and annotated in OneNote)

Using OneNote as a folding outliner

Creating an outline is very similar to creating a table of contents for a document. It is a very effective prewriting activity to create the scaffolding for a book, blog post, *etc.* It is also a very effective way to summarize articles, book chapters, and even complete books. When I have to deal with a lot of information or want to include excerpts and quoted material in my notes, I prefer outlining to mind mapping and in-document note taking.

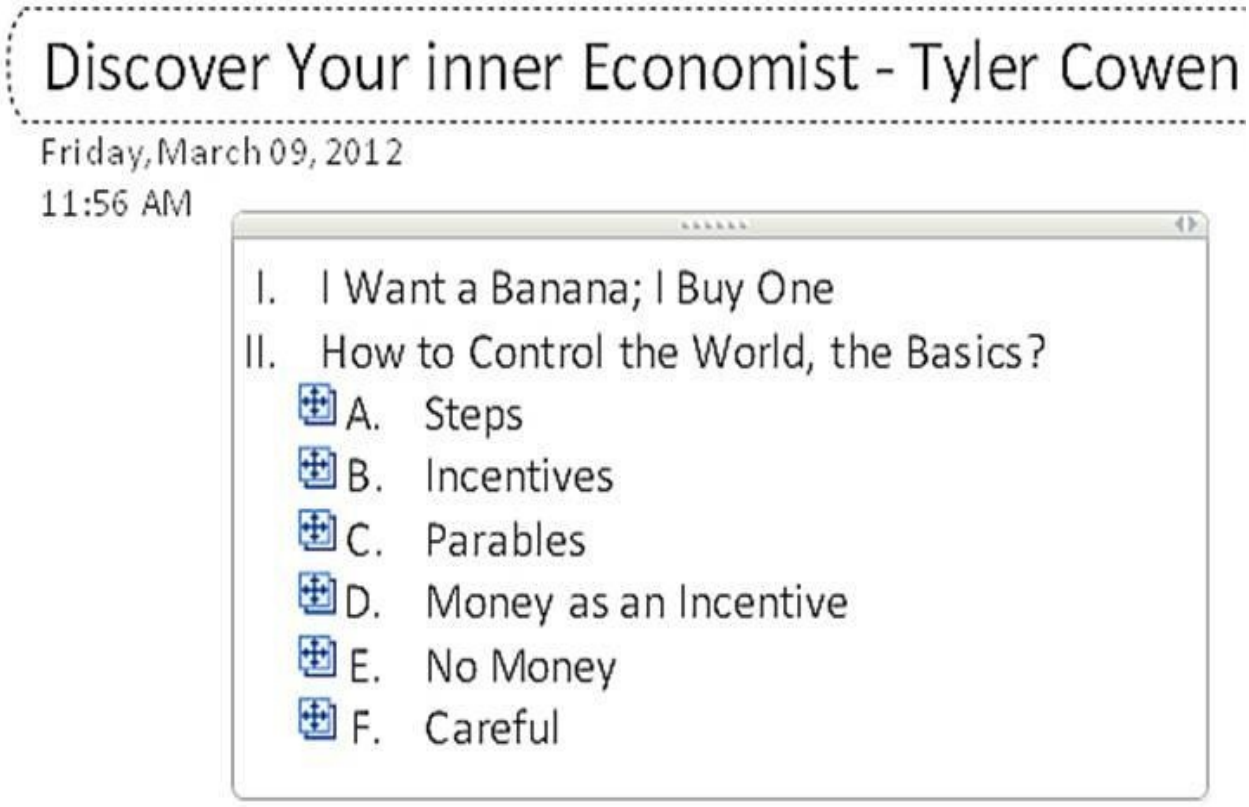
What is an outline?

An outline contains the main topics in a logical arrangement, leaving out the details. It can be flat (i.e., a list of topics) or hierarchical (i.e., containing headings, subheadings, etc.).

Since many texts are organized in a hierarchical fashion, hierarchical outlines can be very effectively used to summarize them while reading. If your document doesn't contain section and subsection headings, you can still use the main ideas to create headings for sections, subsections, and paragraphs and thus build a hierarchical outline.

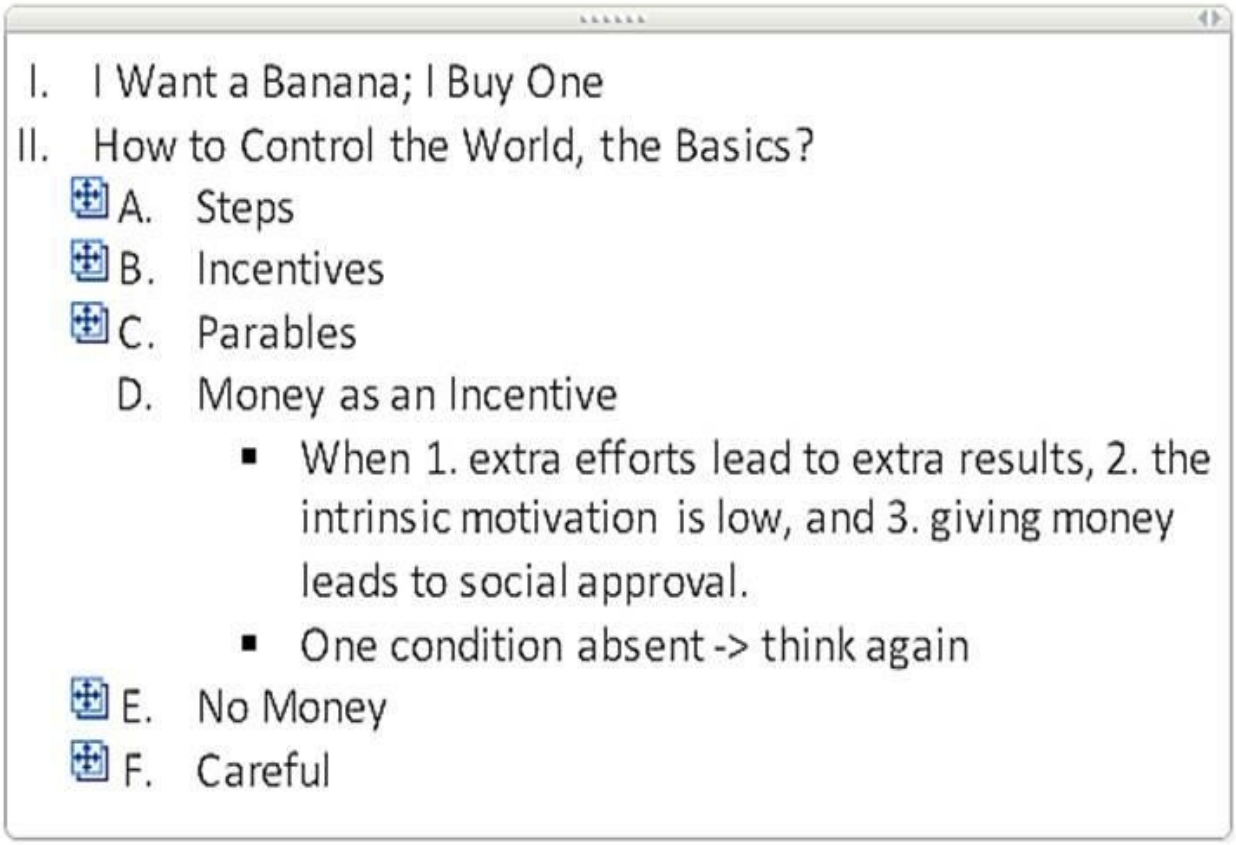
In OneNote, information subsumed under headings and subheadings can be collapsed and thus hidden. This way, you can easily summarize a whole book or book chapter in one hierarchical outline. Once you are done with summarizing a paragraph, subsection, section, or chapter, you just hide its summary under its heading. Collapsed headings together with tags can be used very efficiently as cues to review and test your recall.

In the chapter "How to Read and Memorize a Non-fiction Book" (11), we looked at a mind map summarizing a book chapter from *Discover Your Inner Economist* by Tyler Cowen. Here is my outline in OneNote for the chapter "How to Control the World, the Basics":

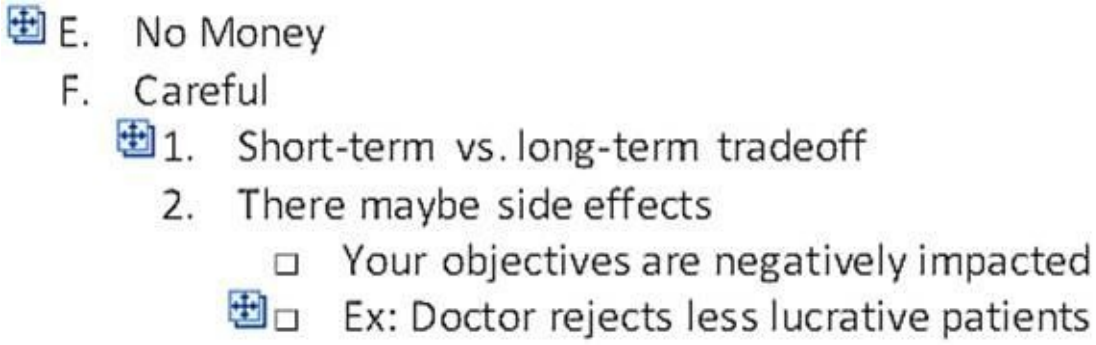

Discover Your inner Economist - Tyler Cowen
Friday, March 09, 2012
11:56 AM
I. I Want a Banana; I Buy One
II. How to Control the World, the Basics?
A. Steps
B. Incentives
C. Parables
D. Money as an Incentive
E. No Money
F. Careful

Take note of the + symbol in front of the headings. It is only present when something is hidden under a particular heading. By double-clicking on this symbol, you can expand the heading. Before reading any further, ask yourself: "When would you give money as an incentive to a person?"

Let's expand the heading *Incentives*:


I. I Want a Banana; I Buy One
II. How to Control the World, the Basics?
A. Steps
B. Incentives
C. Parables
D. Money as an Incentive
When 1. extra efforts lead to extra results, 2. the intrinsic motivation is low, and 3. giving money leads to social approval.
One condition absent -> think again
E. No Money
F. Careful

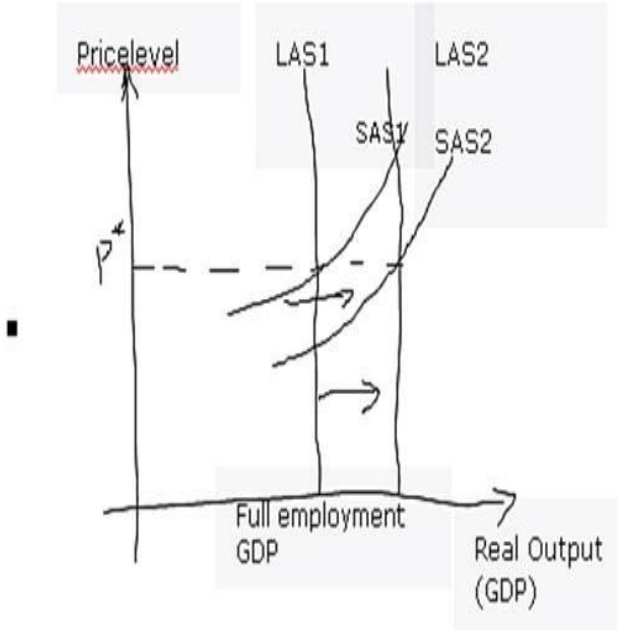
In this way, you can use an expandable outline to test your memory. The heading *Careful* also has subheadings, which you again can expand and collapse:


E. No Money
F. Careful
1. Short-term vs. long-term tradeoff
2. There maybe side effects
Your objectives are negatively impacted
Ex: Doctor rejects less lucrative patients

In essence, you can use this approach to browse through your summary at different levels or to test yourself at different levels, using headings and subheadings as cues.

The information you can use in an outline in OneNote is not limited to text. Other items, such as videos, images, formulas, tables, or a combination thereof, can also be hidden under a heading, as can be seen in the following snippet from an outline on economics:

- Aggregate Supply and Aggregate Demand
  - This is the model of equilibrium output and price level for the overall economy.
  - Long-run aggregate supply (LAS) is vertical at potential (full-employment) real GDP and can change as a result of changes in in the labor force, amount of capital in the economy, or technology (improves productivity of capital and labor)



Images can even be used as headings instead of text, so you could create an image outline. In the following outline, I have replaced the heading *Incentives* with a carrot:

I. I Want a Banana; I Buy One

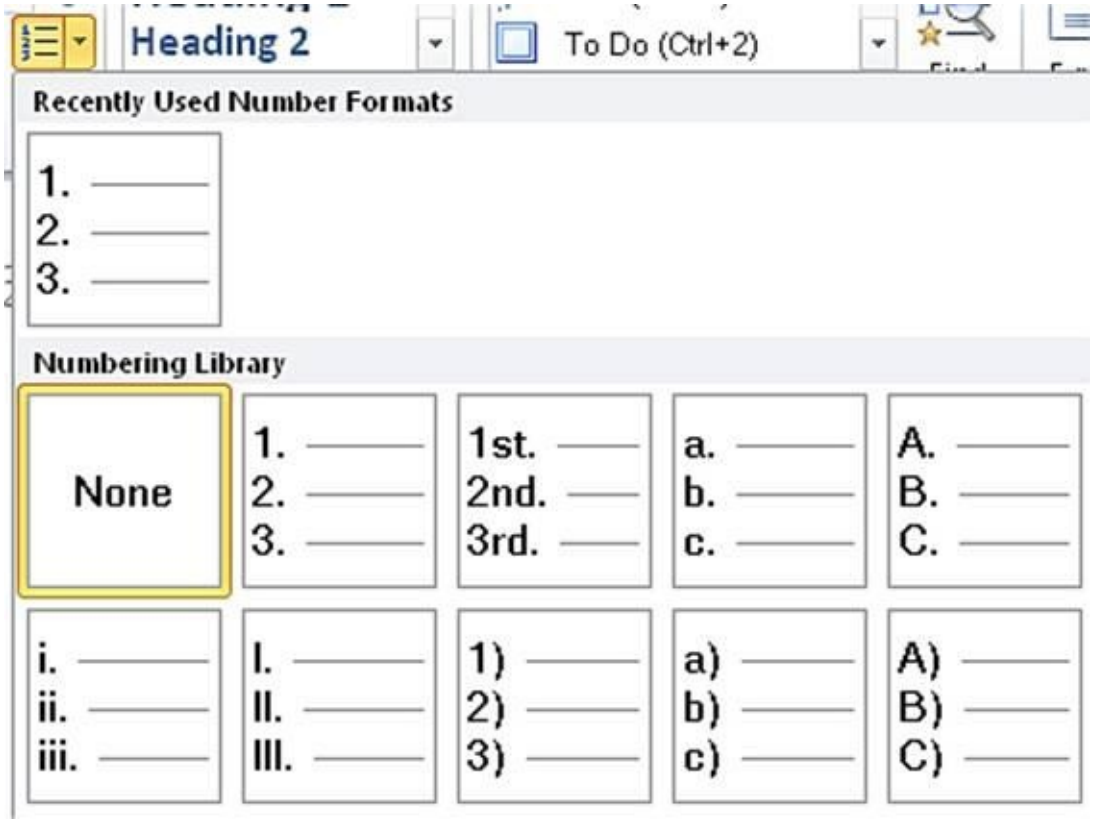
II. How to Control the World, the Basics?

- A. Steps
- B.
  - Respect
  - Recognition
  - Accomplishment
  - Money
- C. Parables
- D. Money as an Incentive
- E. No Money
- F. Careful

16.2 Creating a Summary Outline

If your text at hand follows a hierarchical structure and already has section and subsection headings, the easiest way to proceed is by using your text's headings and subheadings to create an outline skeleton.

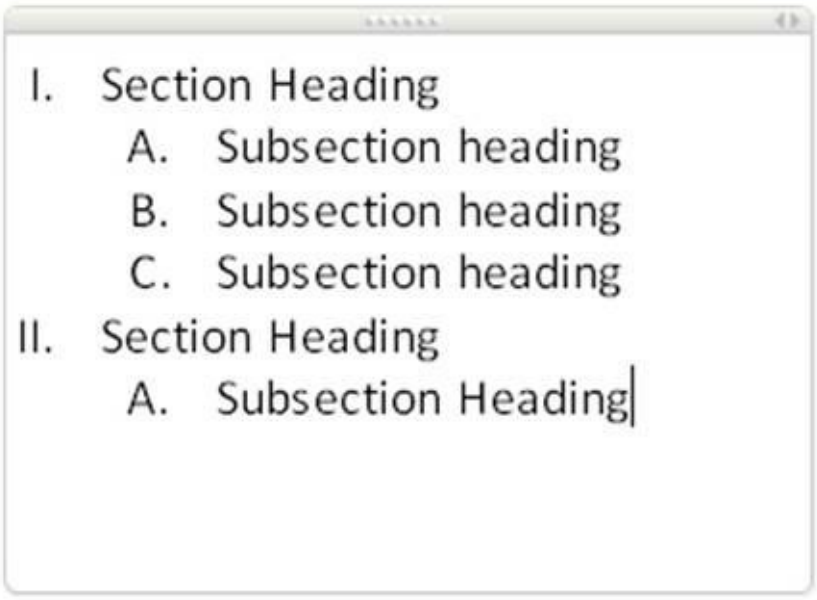
In OneNote, you start by creating a new page and then choosing the numbering style for your section headings:



You then proceed by typing your first section heading. After you have finished, press Enter to type the following section heading. To create a subsection heading, just press Tab. (To move back to section heading level, use Shift-Tab.) If you are not satisfied with the subsection numbering style suggested by OneNote, change it to the style you prefer.

In the following skeleton, I have changed the section headings to Roman numerals and the subsection headings to capital letters. OneNote remembers the style for a particular heading level, so you only have to change it once for an

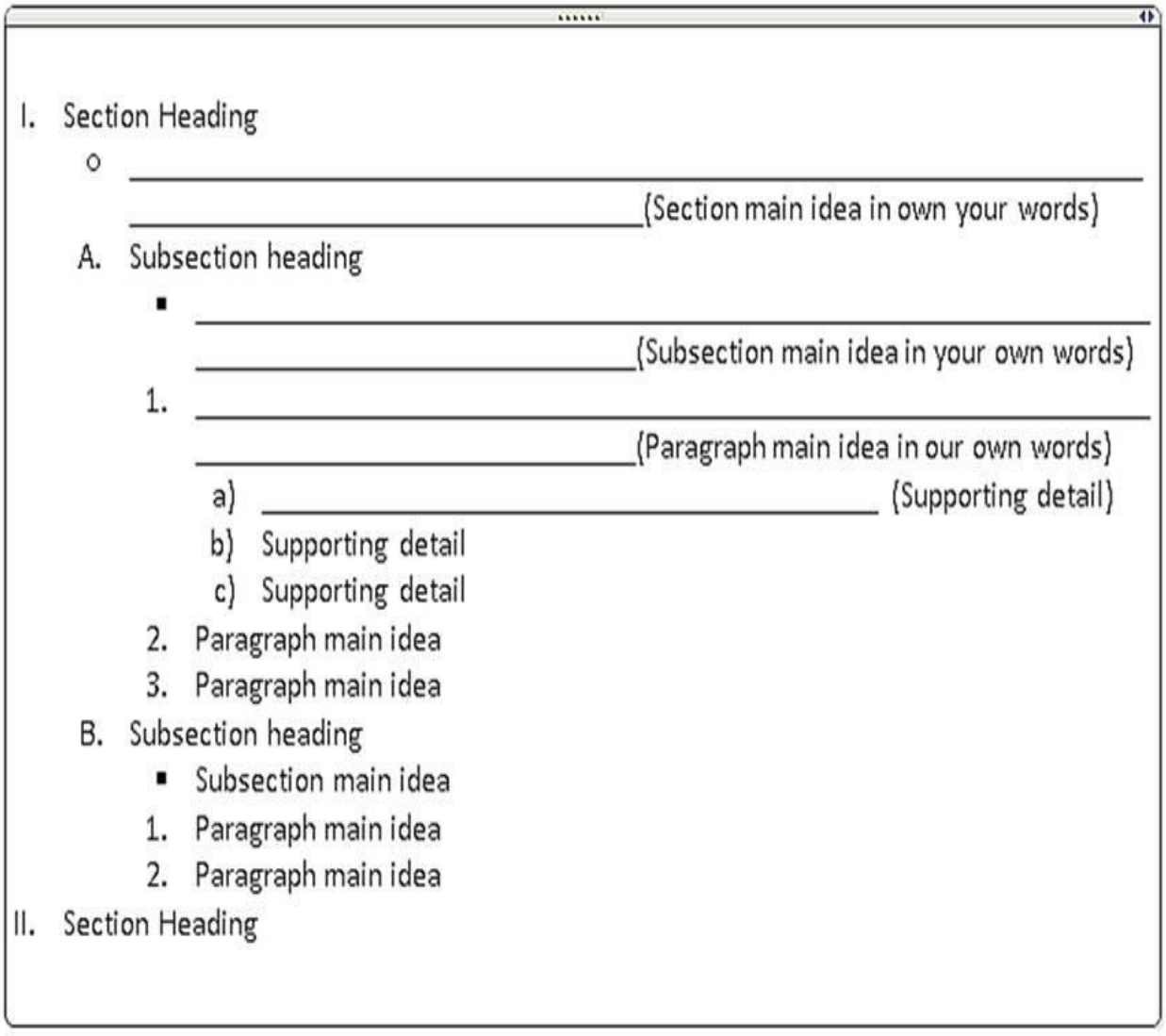
outline.



Having completed your skeleton outline, you can do your reading. To get the big picture, skim your document at least once, and read any included summaries and abstracts.

The easiest way to create a summary outline is by moving up from paragraph to subsection and then from subsection to section.

Read a paragraph and distill its main idea. Use your own words to note down this main idea under the corresponding subsection heading. Then find the most important details supporting the paragraph's main idea, and note them under the paragraph. Proceed in this way for all paragraphs of a subsection, and you will get an idea of what the subsection is about. You can now create a main-idea statement for your subsection. After completing all subsections for a given section, write down a main-idea statement for the section.



Voila, you have completed a hierarchical summary outline.

After having gained some experience, try to go a step further by combining across paragraphs and subsections where suitable. For example, combine paragraphs talking about the same topic.

You can also change the sequential order and choose your own names for your headings. Here you really gain a great advantage by outlining on your computer rather than a sheet of paper. You can change the order, the headings, and everything else at will. OneNote will automatically change the numbering for you to suit your new outline.

You may wonder, “What if my text has no sections at all?”

You can always start with the paragraphs and distill the main paragraph ideas. Do this for the paragraphs of your text. Then proceed by asking yourself which main ideas belong together to form subsections and sections.

How to summarize a paragraph?

Simply spoken, find and state the main idea(s) and important details. If you already have experience with summarizing, you might implicitly be following a set of rules without even thinking about them.

In the 1980s and 90s, American educational psychologist Ann Brown did extensive research on learning and teaching reading comprehension. Based on her and other researchers’ work, she identified six basic rules for summarizing: [60]

1. Delete trivial (unnecessary) information.
2. Delete redundant information.
3. Substitute a superordinate term for a list of items.
   Example: substitute “great apes” for chimpanzees, gorillas, and orangutans.
4. Substitute a superordinate event for a list of actions.
   Example: you could substitute “From September 1990 to October 1991, he went on a trip around the world.” for “In September 1990, he left his home for Russia… The following two months he spent travelling through… Then he went on to…. The last two months, he toured around the U.S. before returning to Germany in October 1991.”
5. Select a topic sentence if one is available.
   Notes:
   - *The topic sentence is the author’s summary of a paragraph.*
   - *In many instances, you can find the topic sentence (or thesis) in the beginning of a paragraph.*
6. If there is no topic sentence, invent your own.

Ann Brown also emphasized that expert summarizers go beyond these six rules

(e.g., they combine across paragraphs and change the order).

These rules can be quite helpful as a reminder. In many instances, however, it is useful to identify or invent the main idea(s) first, so I would start with rules five and six whenever possible. The first four rules can then be used to identify important supporting details for the main idea (as stated in the topic sentence).

In any case, write down the main idea in your own words, instead of just copying the topic sentence. This will help you to think deeper about the topic and improve your memory for the main idea.

What if you cannot find or create the main idea?

To become efficient at finding the main idea and use it for remembering the rest of a piece of writing, it can be very helpful to identify the text structure first. Different text structures also tend to lend themselves to different main-idea structures.

Bonnie Meyer has developed a structure strategy to identify five different text structures (i.e., description, sequence, cause/effect, problem/solution, and comparison) using signaling words. The identified text structure is then used to create the main idea by applying the main-idea pattern that corresponds to the identified text structure.[61]

For example, suppose we identify an article as a comparison because it contains the signaling words *unlike*, *compared*, and *differences*.

We ask ourselves, “What is being compared on what?”

The answer to this question expresses the main idea: products A, B, and C are being compared on features 1, 2, 3, and 4…

We can then use this main-idea pattern to organize our recall in an efficient way and fill in the details.

Bonnie Meyer *et al.* showed that this strategy can significantly improve memory for main ideas and details.[62]

16.3 Using Tags in Your Outline

OneNote includes a large number of predefined *tags*. These tags allow you to label items according to their type or according to what you want to do with them. Each tag normally contains a small symbol and a textual label.

Examples:

Tag	Meaning
	To-do
	Important
	Question
	Idea
	Comment (user defined)
...	

Unlike in many other note-taking applications, in OneNote, tags can be applied not only to whole documents but also to items on a page, such as paragraphs,

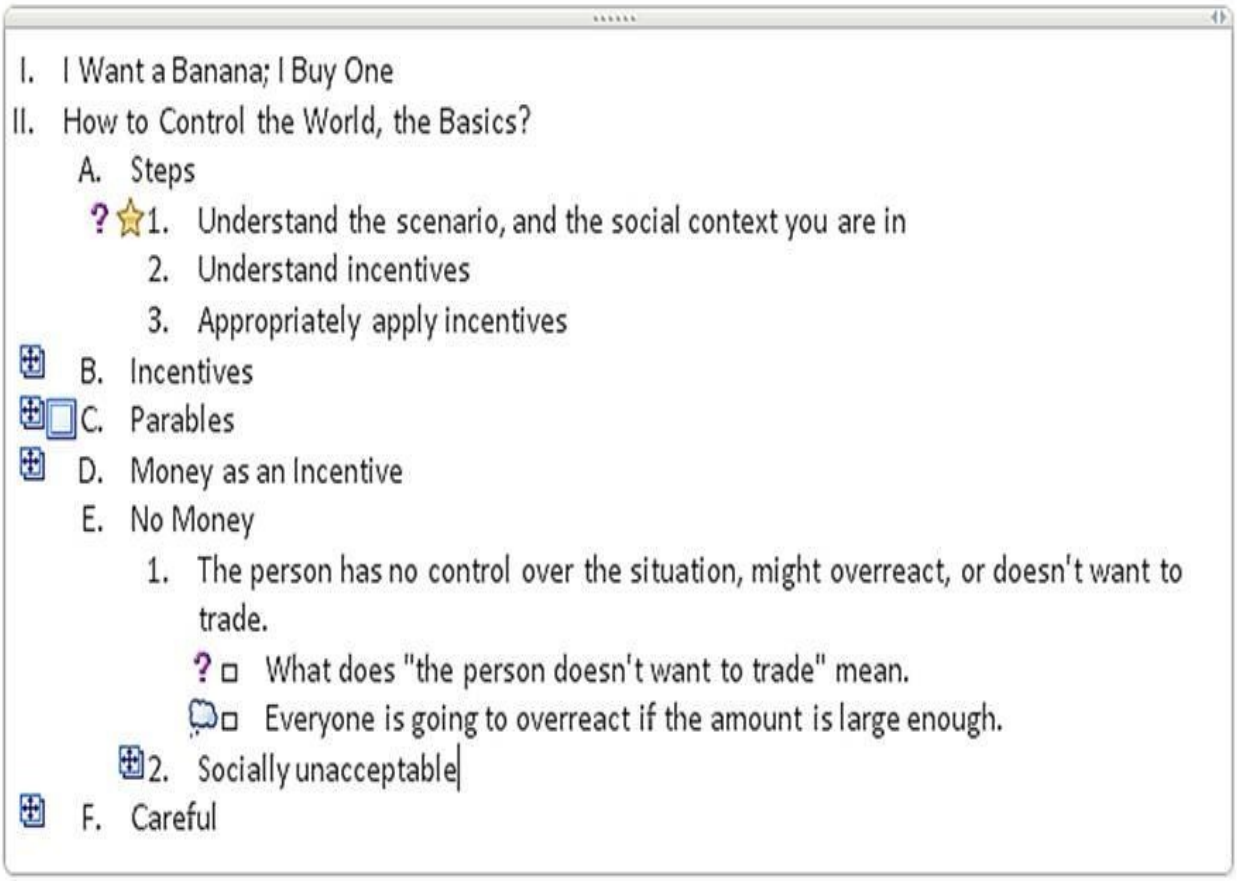
lines, and multimedia. You can apply multiple tags to one item, and you can also define your own tags.

If you are reading a difficult text for the first time, you are most likely encountering information you don't yet understand. Copy this unclear information to your outline under the corresponding heading, and tag it with **Question**.

To emphasize an important idea, which just crossed your mind, and distinguish it from the author's ideas, tag it with **Idea**.

I have defined an additional tag *Comment* to label my comments and clearly distinguish them from the author's ideas. That way, I can at any point include my own comments and thus engage in a conversation with the author.

Here is an example for the use of these tags in an outline:


I. I Want a Banana; I Buy One
II. How to Control the World, the Basics?
A. Steps
1. Understand the scenario, and the social context you are in
2. Understand incentives
3. Appropriately apply incentives
B. Incentives
C. Parables
D. Money as an Incentive
E. No Money
1. The person has no control over the situation, might overreact, or doesn't want to trade.
What does "the person doesn't want to trade" mean.
Everyone is going to overreact if the amount is large enough.
2. Socially unacceptable
F. Careful

After you have clarified a particular point, you can remove the tag.

Using the To-do tag to review information in your outline

We use a hierarchical summary outline to reduce the information in a piece of writing, lecture, *etc.* to its essence. Having completed an outline, we are likely able to recall most of the main ideas and supporting details of a piece of writing by just looking at the section or subsection headings (i.e., we are using them as cues).

As you may recall from the section “Practice Recall to Enhance and Test Your Memory” (4.5), reviewing by testing yourself is one of the most powerful memory enhancers there is. A collapsible/expandable outline can be used very efficiently to facilitate your review.

Let’s assume you want to review an outline and test your recall. To keep track of your efforts, use the *To-do* tag.

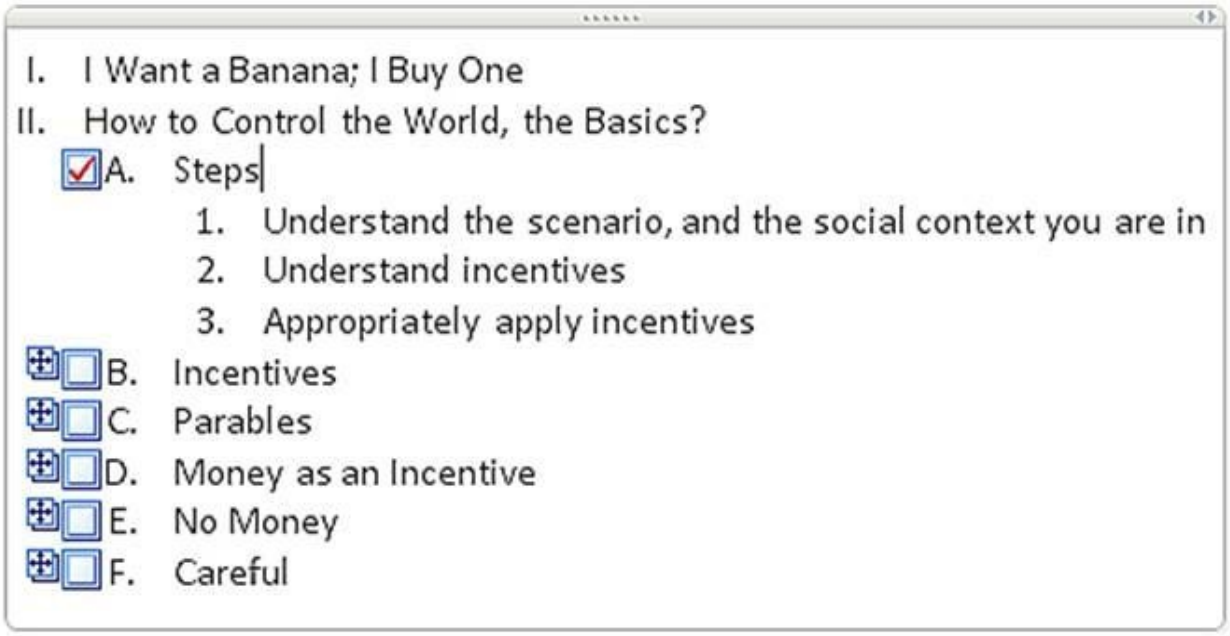
When you first tag an item with **To-do**, it looks like in the table above. Clicking on the tag or tagging the item again changes its shape. Tagging it a third time removes the to-do tag.

The following assumes that you have an outline with chapter headings at the top-level (like in the next screenshot):

To review a chapter at the section level, collapse the outline to the section level (for example by placing the cursor in the chapter heading and pressing **Alt-Shift-2**), select the complete chapter (by clicking to the left of the chapter heading), and assign the **To-do** tag by pressing **Ctrl-1** (or by selecting it from the menu):

I. I Want a Banana; I Buy One
II. How to Control the World, the Basics?
A. Steps
B. Incentives
C. Parables
D. Money as an Incentive
E. No Money
F. Careful

Now use the section headings, starting with *Steps* to test your recall: What are the steps to control the world? Try to recall the steps, and then expand the section (by double-clicking the **plus sign** in front of it) to see how well you did. If you got all three steps, click on the **To-do** tag to mark it as complete. If not, leave the tag as it is. Collapse the section heading *Steps* and query yourself using the next section heading *Incentives*…


I. I Want a Banana; I Buy One
II. How to Control the World, the Basics?
A. Steps
1. Understand the scenario, and the social context you are in
2. Understand incentives
3. Appropriately apply incentives
B. Incentives
C. Parables
D. Money as an Incentive
E. No Money
F. Careful

Notes:

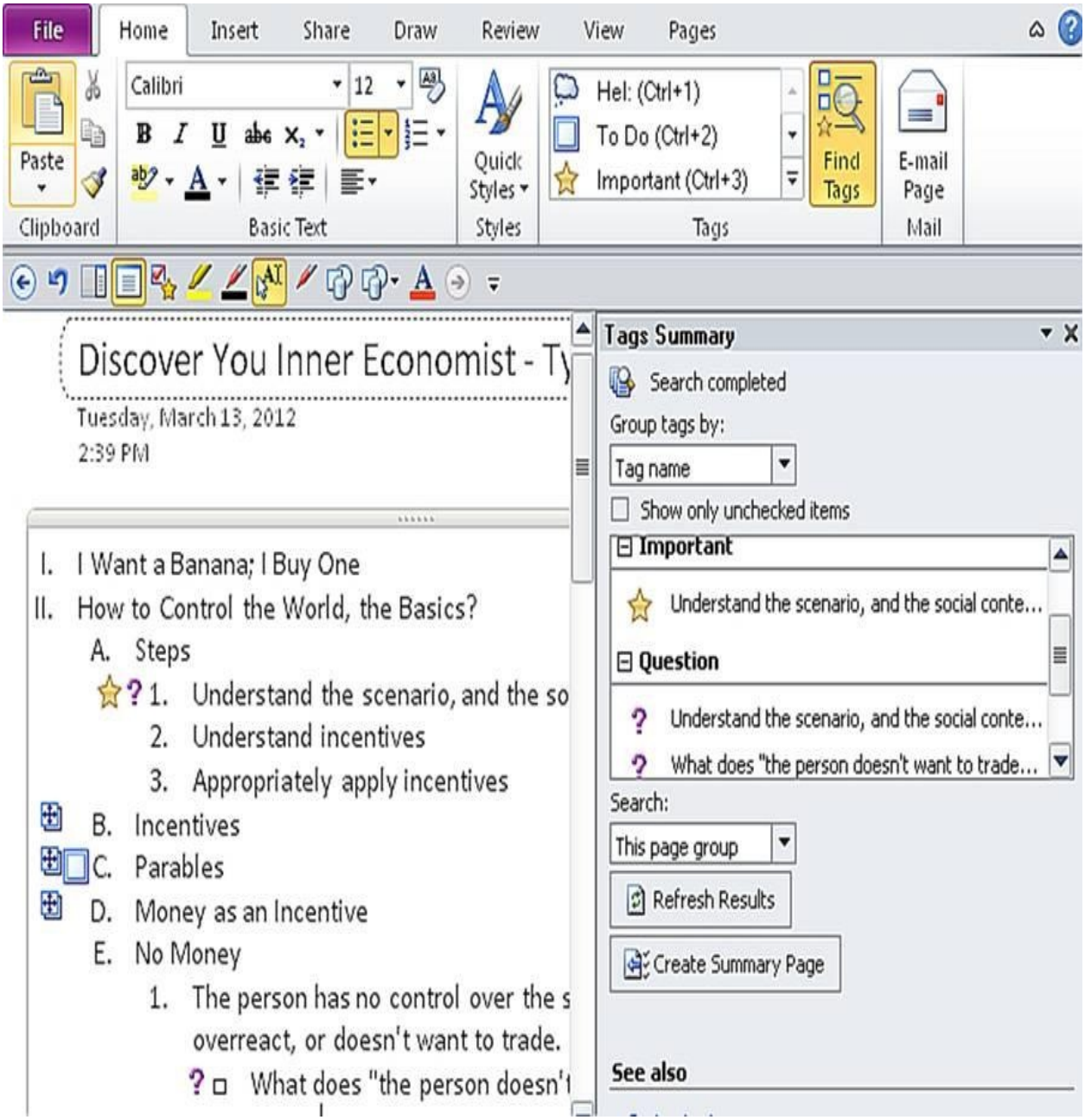
- *Whether you successfully recalled a section or not, you should always collapse a heading after you have tried to recall it to keep your focus on the section you are currently working on.*
- *You can also start at the subsection level. In this case, expand the section you want to test, select the section and all subsumed subsections, and again assign the To-do tag.*

After you have successfully recalled all sections in a chapter, tag the chapter as "done."

Creating a Tags Summary

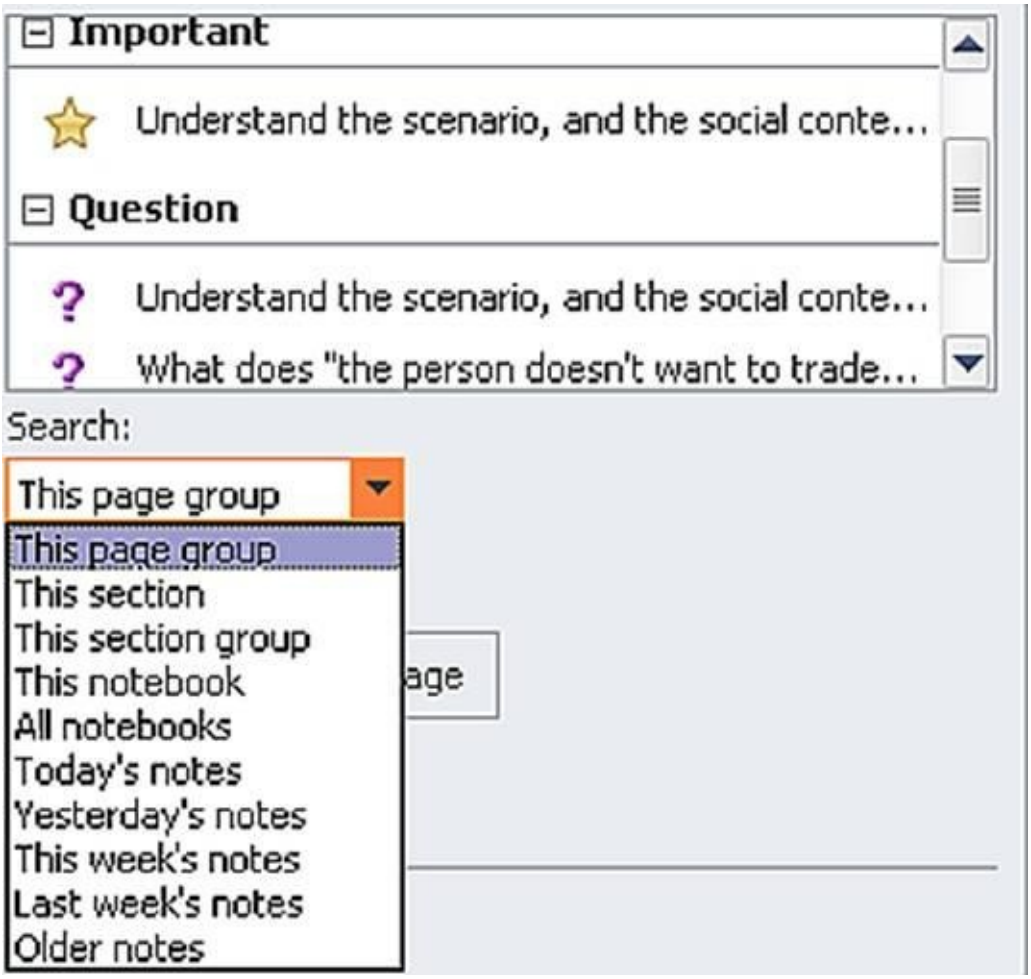
Whether you have used tags in many different places in your outline (or other pages), or want to combine tags from different outlines, creating a summary of all tagged items allows you to get an overview. OneNote allows you to click on a tagged item in your summary and shows you exactly where in your original outline (or other document) the tagged item is. You can, for example, get a list of all your questions and then work through them systematically, no matter where they are in your outline.

To create a tags summary in OneNote 2010, choose **Find Tags** in the **Home** tab (Home ribbon). As a result, you get an additional pane *Tags Summary*, showing all tagged items on your page:



Upon clicking on a tag in Tags Summary, OneNote takes you right to where the tagged item is on your page. If a tag is hidden under a collapsed heading, OneNote expands the heading and shows you the item. This way, you can systematically go through all open questions (or to-do items) in your outline.

Apart from creating a tags summary for one page, you can also create one for all pages in a section, section group, or notebook. For example, you could use this to collect all items tagged *To-do*, no matter on which page, section, or notebook they are:



To permanently keep your tags summary, click on **Create a Summary Page** (*see screenshot Tags Summary*).

This concludes our chapter “External Note Taking and Outlining” and with it, this book. I hope you have enjoyed reading this book as much as I have enjoyed writing it.

Afterword

I enjoy studying and learning a lot and to this day spend a significant part of my time learning and staying on top of information. I am using the techniques and tools I laid out in front of you in this book. I have found them extremely helpful for my own journey as a lifelong learner and in my profession. They have also helped me to pass all exams thrown at me throughout my life as a student and as an adult.

You have read this far, so you know what this book is about. Could I ask you to post a book review on Amazon.com and share your opinion with other readers? Your book review is very important because it helps potential readers to decide whether this book is for them or not, and it gives me, the author, valuable feedback. Thanks a lot!

I am also very grateful for your personal feedback. You can reach me at feedback@remembereverything.org.

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Sincerely,

Helmut Sachs

About the Author

Helmut Sachs is a lecturer, trainer, manager, and computer engineer. For the last several years, he has been teaching creative and critical thinking and information literacy at colleges and in workshops. Helmut spent over 10 years managing and implementing projects for large enterprises in Europe and Asia, and has extensive experience in information management and professional training.

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